Service Manual

Color Video Camera

MODEL **WV-4860**

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Panasonic

ORDER NO. VKD83070765C4

Service Manual

Vol. 1

Circuit Description

Color Video Camera
WV-4860

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Panasonic

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PRODUCT COMPLIES WITH DHHS RULES 21 CFR SUBCHAPTER J APPLICABLE AT DATE OF MANUFACTURE

SAFETY PRECAUTION

GENERAL GUIDELINES

1. When service is required, observe the original lead dress. Components, wires or cables that indicate evidence of overheating or other electrical or mechanical damage should be replaced.
2. After servicing see to that all the protective devices, such as insulation tape, shields must be properly installed.
3. Potentials as high as 5KV are present when the electronic viewfinder is operating. Operation without the camera head side covers, finder case assembly of electronic viewfinder and covers of power supply unit or remote control unit presents a danger of shock hazard from the camera power supply.
   Servicing should not be attempted by anyone who is not thoroughly familiar with the precautions that should be taken when working on high-voltage equipment. Always discharge the anode of the picture tube to the main chassis before handling the tube.
4. After servicing, make the following leakage current checks to prevent the customer from being exposed to shock hazards.

LEAKAGE CURRENT COLD CHECK

Conduct this test on the power supply unit or remote control unit with the camera disconnected and repeat with the camera, power supply unit and electronic viewfinder properly assembled. Also, repeat test with and without available approved accessories/cables/connectors.

1. Turn the AC switch ON.
2. Measure the resistance value, with an ohmmeter, between the jumpered AC plug and each exposed terminal and screwheads.
   When the exposed metallic part has a return path to the chassis, the reading should be between 1M and 5.2M. When the exposed metal does not have a return path to the chassis, the reading must be ∞. (infinity)
   Any resistance value below this range indicates an abnormality which requires corrective action.
3. Repeat the test with the AC switch in the OFF position.

LEAKAGE CURRENT HOT CHECK

Conduct this test on the power supply unit or remote control unit with the camera disconnected and repeat with the camera, power supply unit or remote control unit and electronic viewfinder properly assembled. Also, repeat test with and without available approved accessories/cables/connectors.

1. Plug the AC cord directly into adaptor socket and plug adaptor into the AC outlet. Do not use an isolation transformer for this check.
2. Connect a 1.5K ohms/10 watt resistor, paralleled by 0.15 μF capacitor, between each exposed metallic part on the unit and a good earth ground such as a water pipe, as shown in figure 1.
3. Use an AC voltmeter, with 1000 ohms/volt or more sensitivity, to measure the potential across the resistor.
4. Check all exposed metallic parts of the cover (BNC connector, Handle bracket, metallic cabinet, Screwheads, Metallic overlays, etc.), and measure the voltage at each point.
5. Reverse the AC plug in the AC plug adaptor and repeat each of the above measurements.
6. The potential at any point should not exceed 0.75V RMS.
   A leakage current tester (FLUKE MODEL : 8000A equivalent) may be used to make the hot checks. Leakage current must not exceed 0.5 milliampere. In case a measurement is out side of the limits specified, there is a possibility of a shock hazard, and corrective action must be taken before returning the instrument to the customer.

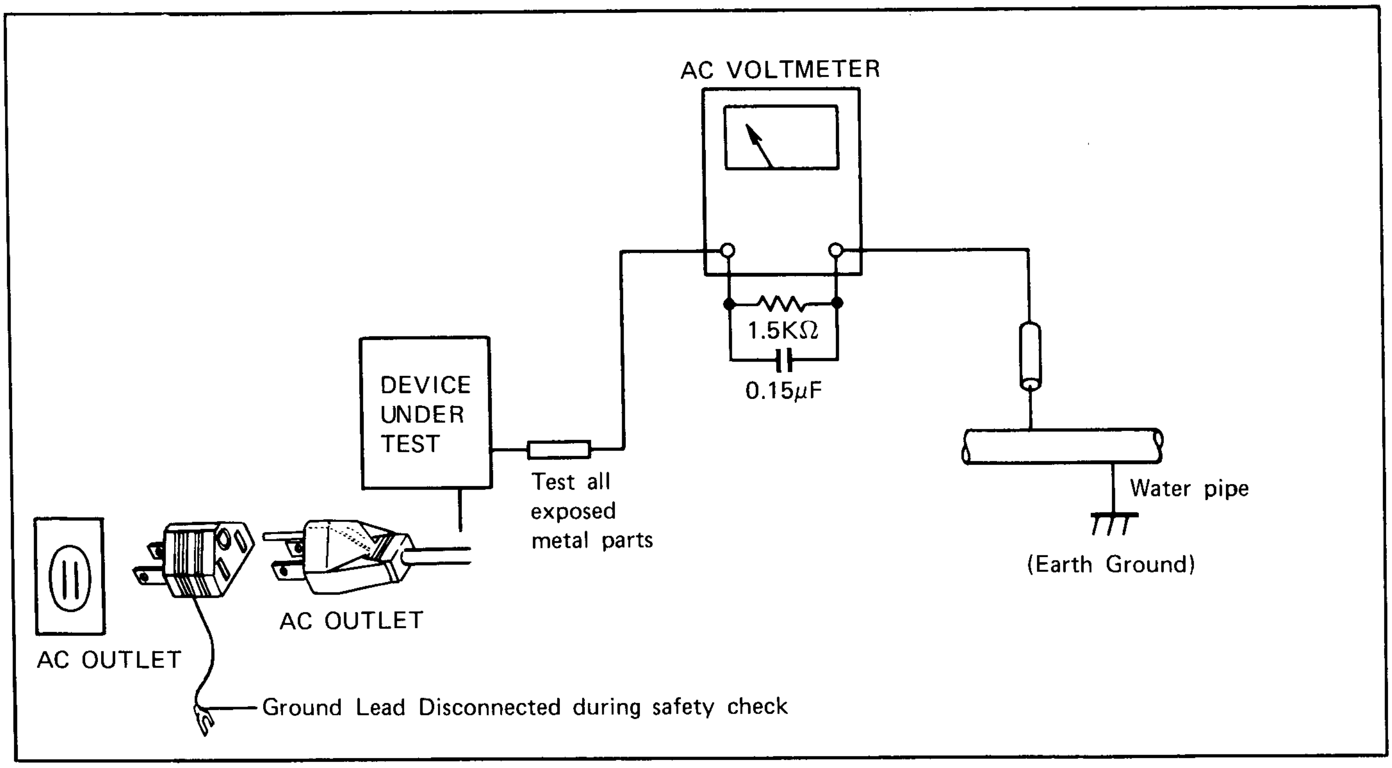
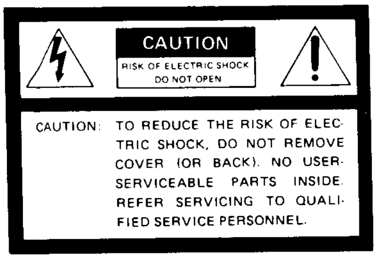


Figure 1. Leakage Current Hot Check

X-RADIATION

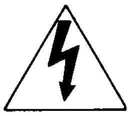
1. The potential source of x-radiation in electronic viewfinder is the high-voltage section and picture tube.
2. It is important to use a periodically checked and accurate high-voltage meter, to monitor and check the high voltage.
   Rotate the brightness control and contrast fully counterclockwise for this test.
3. Observe that the high voltage does not exceed the specified value.
   Excessive high voltage may cause a possible x-radiation hazard.
   The camera system should be repaired as soon as possible.
4. It is essential to use the specified picture tube to avoid a possible x-radiation hazard.



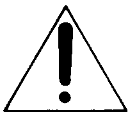
CAUTION

RISK OF ELECTRIC SHOCK DO NOT OPEN

CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER (OR BACK). NO USER-SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.



This symbol warns the user that uninsulated voltage within the unit may have suificient magnitude to cause electric shock. Therefore, it is dangerous to make any kind of contact with any inside part of this unit.



This symbol alerts the user that important literature concerning the operation and maintenance of this unit has been included.
Therefore, it should be read carefully in order to avoid any problems.

IMPORTANT SAFETY NOTICE

There are special components used in this equipment which are important for safety. These parts are shaded on the schematic diagram and on the replacement parts list. It is essential that these critical parts should be replaced with manufacturer's specified parts to prevent shock, fire, or other hazards. Do not modify the original design without permission of manufacturer.

SPECIFICATIONS

CAMERA WV-4860

Power Source :	12V DC
Power Consumption :	Approx. 4.6 Watts (Approx. 0.8 Watts at STANDBY 1, Approx. 0.3 Watts at STANDBY 2)
Scanning :	525 lines/60 fields/30 frame per second
Pick-up System :	Single tube frequency separation system
Pick-up Tube :	One 2/3" integral stripe filter electrostatic focus, magnetic deflection, separate mesh Newvicon® tube
Video Output Level :	1.0 Vpp NTSC composite/75 ohms
Horizontal Resolution (Luminance) :	300 lines at center
Signal to Noise Ratio (Luminance) :	46 dB
Illumination Required :	140 footcandles (1,400 lux) at F4.0
Required Minimum Illumination :	1 footcandle (10 lux) at F1.4
Detachable Microphone :	Stereo
External Microphone Input :	-65 dB 600 ohms unbalance M3 Jack
Audio Output :	-20 dB/High Impedance
Earphone Output :	8 ohms M3 Stereo Jack
Lens :	Auto Focus Lens 8:1 Automatic Light/Iris Control, Power Zoom ; 10.5 - 84mm F1.4, Filter Diameter ϕ 58 mm
Zoom Speed :	FAST : Approx. 7.5 seconds, SLOW : Approx. 12 seconds
Lens Mounting :	Bayonet mount
Viewfinder :	1.5" Electric Viewfinder (actual visual size 1-3/8" measured diagonally) with graphics display
White Balance :	Automatic Control
10 pin Camera Cable Length :	Approx. 8 feet (2.5m)
Maximum 10 pin Camera Cable Length :	Approx. 75 feet (23m) between camera and portable VTR/VTR/Power Supply
Operational Ambient Temperature :	32°F – 104°F (0°C – 40°C)
Operational Ambient Humidity :	Less than 90%
Camera Mounting :	One 1/4" - 20 threaded hole standard camera tripod
Dimension :	200(W) x 230(H) x 308(D) mm 7-7/8"(W) x 9-1/16"(H) x 12-1/8"(D)
Weight (without cable) :	2.0 kg (4.4 lbs)

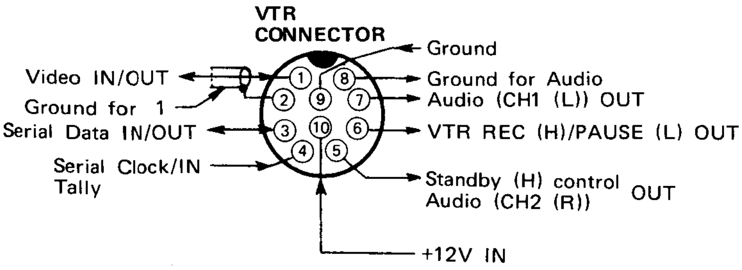
STANDARD ACCESSORIES

● Lens Cap	1 pc
● Accessory Shoe Adaptor	1 pc
● SUM-3, AM-3 or AA size dry battery .	1 pc

OPTIONAL ACCESSORIES

● Film/Slide Adaptor	WV-AD15
● Camera Remote Controller	WV-CR10E
● Home Telecine	WV-J20E
● Lens Filter Kit	WV-LK10
● 1.5X Tele Conversion Lens	WV-CL16E
● 12X Zoom Lens	WV-LZ09/12X
● Extension Cable	10H-50AS

VTR CABLE SIGNAL INFORMATION



1 Principle of Single Carrier Frequency Multiplexing System using a Single Tube

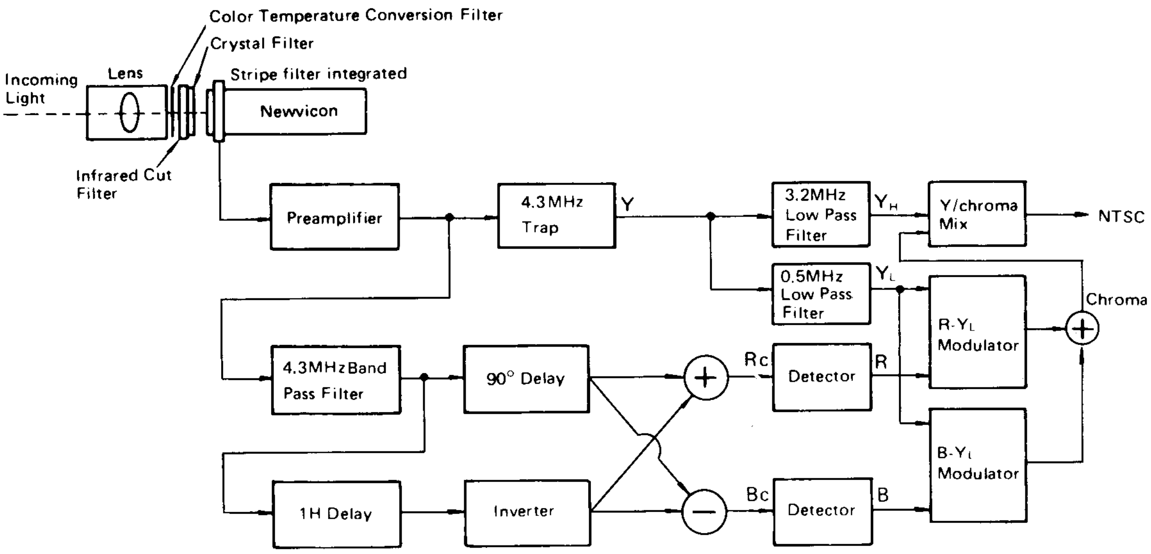

Color Temperature Conversion Filter
Crystal Filter
Incoming Light
Lens
Stripe filter integrated
Newvicon
Infrared Cut Filter
Preamplifier
4.3MHz Trap
Y
3.2MHz Low Pass Filter
Y_H
Y/chroma Mix
NTSC
0.5MHz Low Pass Filter
Y_L
Chroma
R-Y_L Modulator
4.3MHz Band Pass Filter
90° Delay
Rc
Detector
R
B-Y_L Modulator
1H Delay
Inverter
Bc
Detector
B

Fig.1-1 Principle of Single Carrier Frequency Multiplexing System using a Single Tube

The incoming light to the camera which passes through the automatic iris control(AIC) lens, the color temperature conversion filter, the infrared(IR) cut filter and the crystal filter reaches the surface of the integrated stripe filter in a 2/3" pick-up tube(YFS4158KIT).
The diffusion filter is inserted between the AIC lens and the color temperature conversion filter when the white balance switch is set to the SET position.

Color Temperature Conversion Filter

Generally, the human eye is sensitive to electromagnetic waves from 380mμ(mμ=nm) to 780mμ in wavelength-(the visible region). In addition, the human eye also discerns the wavelength difference as a color difference. The human eye responds to the light between 400mμ to 500mμ wavelength as predominantly blue information, the light between 500mμ to 600mμ as green information, and the light between 600mμ to 700mμ as red information. The entire light in the "visible" range of wavelength from 380mμ to 780mμ is seen as different amount of white light.

When a carbon is burned, it emits light of a different quality depending on how hot it is. Various natural light can be expressed in terms of a color temperature which may be referred to a light emitted from the burning carbon used as a standard. A light source of 3200°K (K=Kelvin: -273°C corresponds to 0°C an absolute temperature) color temperature, which is used in studios, implies that its quality (color) is the same as that emitted from the carbon burning at 3200°K(2927°C) The relationship between the color temperature of light sources used for illumination and weather conditions are shown in Fig. 1-4. The color temperature goes up as the weather turns overcast from clear. This may be related to the burning carbon(charcoal) as follows. When the charcoal is heated and begins to glow (at low temperature), it emits a reddish light. But when it is so-called white hot (at high temperature), a bluish light is emitted. In other words, the light at a low color temperature is considered reddish and at high color temperature is considered bluish.

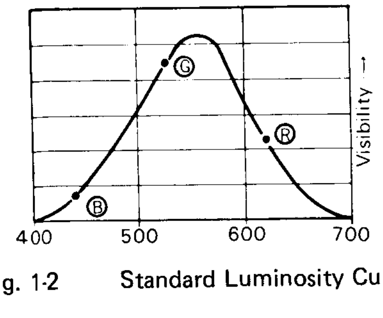


Fig. 1-2 Standard Luminosity Curve

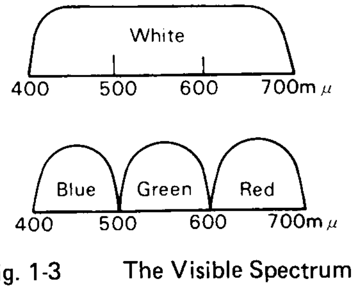

White
400
500
600
700mμ
Blue
Green
Red
400
500
600
700mμ

Fig. 1-3 The Visible Spectrum

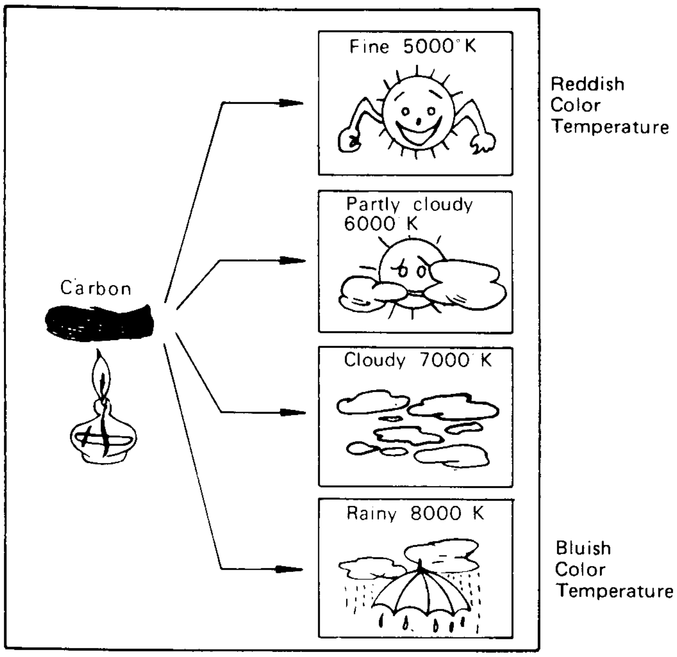


Fig. 1-4 Color Temperature and Weather Conditions

When a color camera is pointed at an object illuminated by a light of low color temperature, it reproduces a reddish picture.

When a color camera is pointed at an object illuminated by a light of high color temperature, it reproduces a bluish picture. The color camera has the indoor-outdoor selection switch which corrects for the color temperature of the light. When the switch is set to the outdoor position, the 5500°K COLOR TEMPERATURE CONVERSION FILTER is inserted into the light path to convert the color temperature from 5500°K to 3200°K In addition to the indoor-outdoor selection switch utilizing the color temperature conversion filter, this camera is designed so that the level of red and blue signals can be changed independently to meet the color temperature of the light source in order to ensure proper color reproduction.

Infrared Cut Filter

As shown in Fig. 1-5, the pick-up tube has some sensitivity in the infrared region beyond the visible range. The infrared(IR) cut filter cuts off the infrared light rays which the human eye does not see as light. If the color signal is made by using the video signal corresponding to the infrared rays which the human eye can not normally see, the color of pictures on the monitor and that seen with the naked eye would differ substantially.

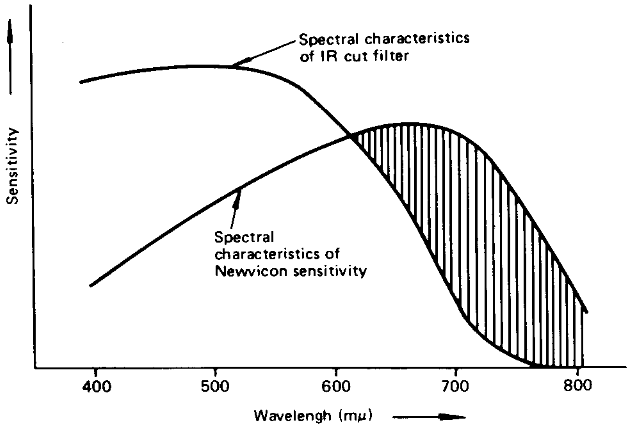


Fig. 1-5 IR Cut Filter Response

Crystal Filter

As described later, since the red and blue images are modulated by the fine stripe filter built into the pick-up tube , false signals could develop due to interference between the stripe filters and fine detail objects. The crystal filter is an optical low pass filter which prevents the occurrence of such false signals by blocking the high frequency components of images.

Diffusion Filter

When the white balance switch is set to SET position, the diffusion filter is inserted between the AIC lens and the color temperature conversion filter to diffuse the incoming light, and the whitish light reaches the pick-up tube.

Pick-up Tube

Different from that of the black and white camera, the pick-up tube used in this color camera has a built-in stripe filter, a metallic stripe called the optical black(OB) located on the face-plate. The video signal's black level is set in reference to the signal from the optical black.

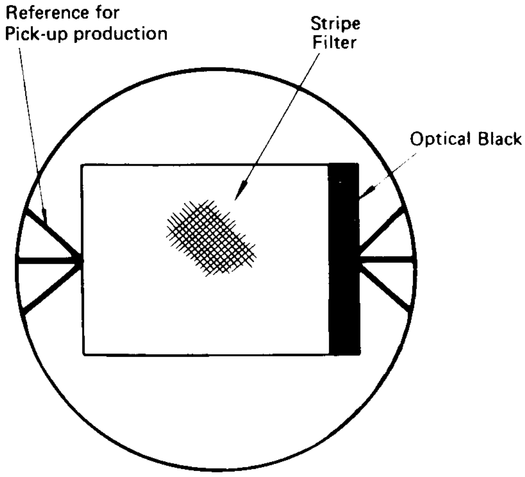


Fig. 1-6 Front View of YFS4158KIT Newvicon®

As shown in Fig.1-9 Ⓑ , the stripe filter integrated into the pick-up tube consists of a cyan/transparent stripe filter section and a yellow/transparent stripe filter section. These stripe filters are so arranged as to be of the same pitch in the horizontal scanning direction, and have equal angles with respect to the vertical. The pick-up tubes even and odd scanning lines pass the tracks of the stripe filters that are arranged in the same way. In other words, the even and odd scanning lines are spaced "a" apart.

For easy understanding, let' assume that light of uniform level containing green(G), red(R), and blue(B) reaches the pick-up tube(Fig. 1-9 Ⓐ), and that the crosspoint of cyan and yellow stripe filter is scanned as shown in Fig. 1-9 Ⓑ .

Let's consider the light output from the stripe filter. The cyan filter cuts off the red(R) light which is complementary to it, and the yellow filter cuts off the blue(B) light which is complementary to it. (Fig. 1-7).

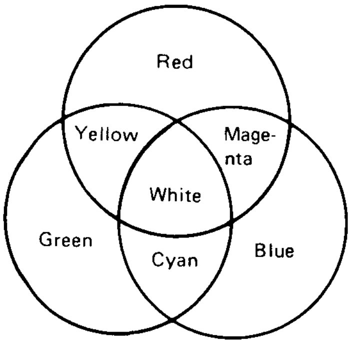


Fig. 1-7 Complementary Color

The light output Ⓒ , which corresponds to the Nth scanning line contains the modulated R and B components, riding on top of unmodulated G component. The light output Ⓓ , which corresponds to the N+1st scanning line contains the modulated R and B components, riding on top of the unmodulated G components. Light output Ⓔ , Ⓕ , and Ⓖ correspond to N+2nd, N+3rd and N+4th scanning lines respectively. The light Ⓒ for the Nth line and the light Ⓖ for the N+4th line are exactly same.

The stripe filters have the same pitch in the horizontal scanning direction, and the same angle in the vertical directions so that there is a phase difference of 90° among modulated components.

The pick-up tube produces the video signal whose waveform is the same as the that of the light which comes from the stripe filter.

The modulation frequency for the R and B signals can be calculated from the following equation.

$$f = \frac{w \times 10^3}{p \times t} \quad (\text{MHz})$$

Here, f : Modulation frequency (MHz)

W : Horizontal width of effective scanning area of pick-up tube (mm)

p : Stripe filter pitch (μm)

t : Horizontal video signal duration (line duration (1H)-horizontal blanking duration (H.BL)) (μs)

Specially;

$W = 7.71\text{mm}$

$p = 34.3\ \mu\text{m}$

$t = 1\text{H} - \text{H.BL} = 63.5 - 11.2 = 52.3\ \mu\text{s}$

$$f = \frac{w \times 10^3}{p \times t} = \frac{7.71 \times 10^3}{34.3 \times 52.3} = 4.3\text{MHz}$$

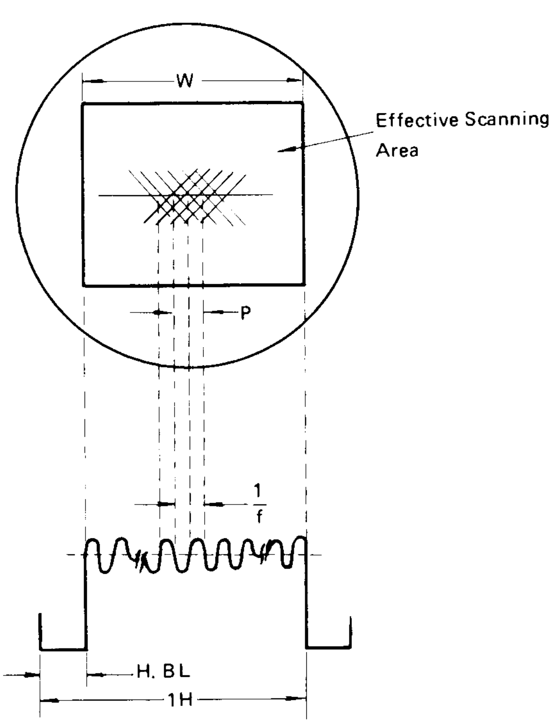


Fig. 1-8 Modulation Frequency

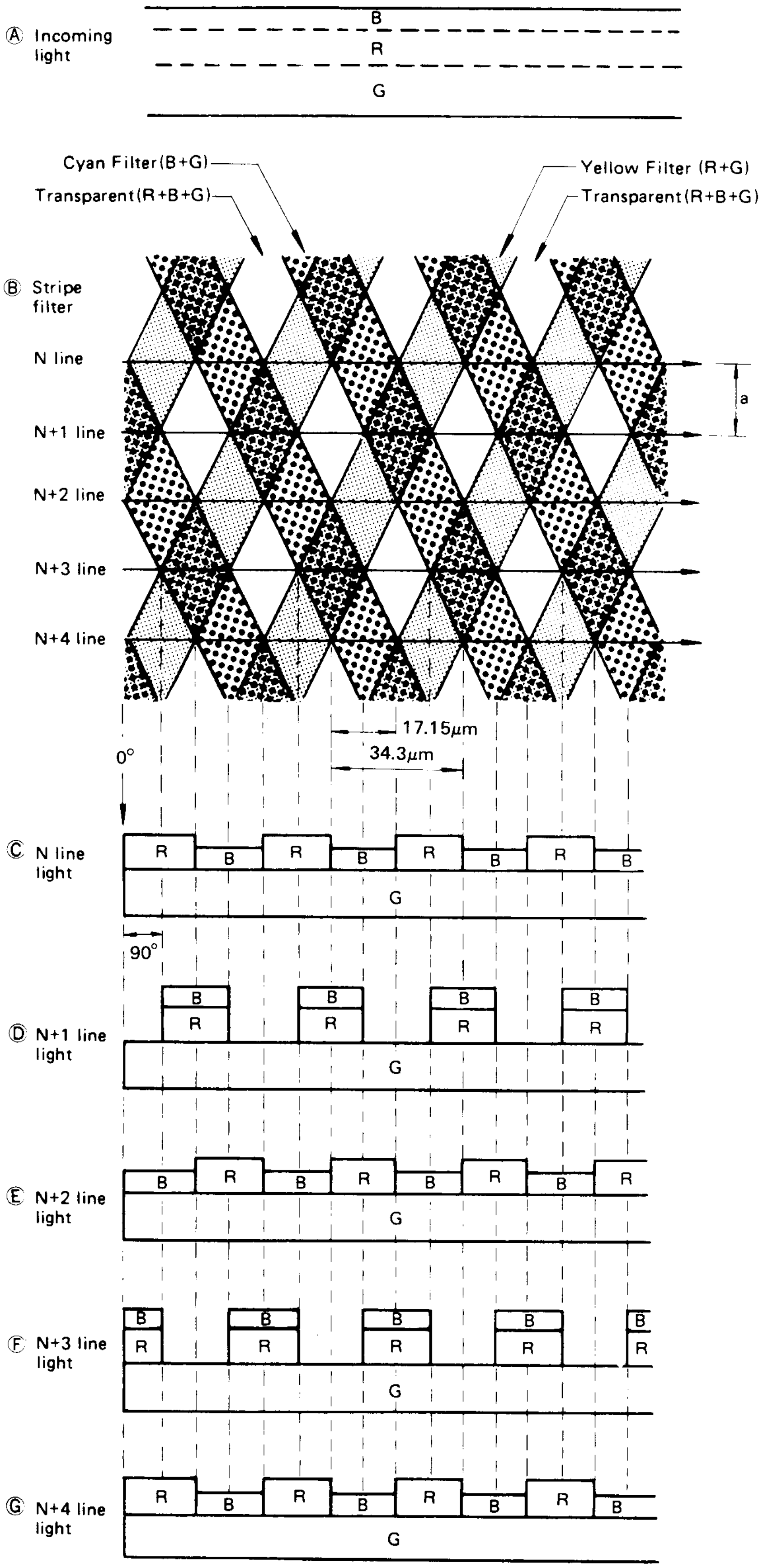

Ⓐ Incoming light
B
R
G
Cyan Filter(B+G)
Transparent(R+B+G)
Yellow Filter (R+G)
Transparent(R+B+G)
Ⓑ Stripe filter
N line
N+1 line
N+2 line
N+3 line
N+4 line
a
17.15μm
34.3μm
0°
Ⓒ N line light
R
B
G
90°
Ⓓ N+1 line light
B
R
G
Ⓔ N+2 line light
B
R
G
Ⓕ N+3 line light
B
R
G
Ⓖ N+4 line light
R
B
G

Fig. 1-9 Light from Stripe Filter

The incoming light is thus converted by the integrated stripe filter into a signal which contains R and B signals modulated by 4.3MHz, and the G signal.

This signal is sent to the preamplifier, where it is amplified. The amplified signal Ⓗ (see Fig. 1-11) from preamplifier is sent to the 4.3MHz trap circuit, which passes only the luminance(Y) signal Ⓘ comprising the G signal and the mean value of the modulated R and B signals. The mean value of modulated R and B signals on adjacent scanning lines are equal so that the luminance signal corresponding to two successive lines is also equal (see Fig. 1-10) due to the characteristics of the trap circuit.

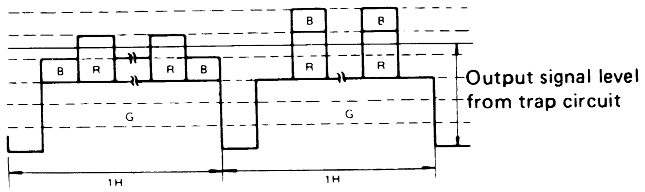

B
R
G
1H
Output signal level from trap circuit

Fig. 1-10 Detection of Y signal

The Y signal thus obtained is supplied to the 3.2MHz low pass filter and the 0.5MHz low pass filter. The luminance(YH) signal having high frequency response and the luminance signal (YL) having low frequency response come out from these low pass filters.

The YH signal is supplied to the Y/chroma mix circuit and the YL signal to the R-YL and B-YL modulator circuits.

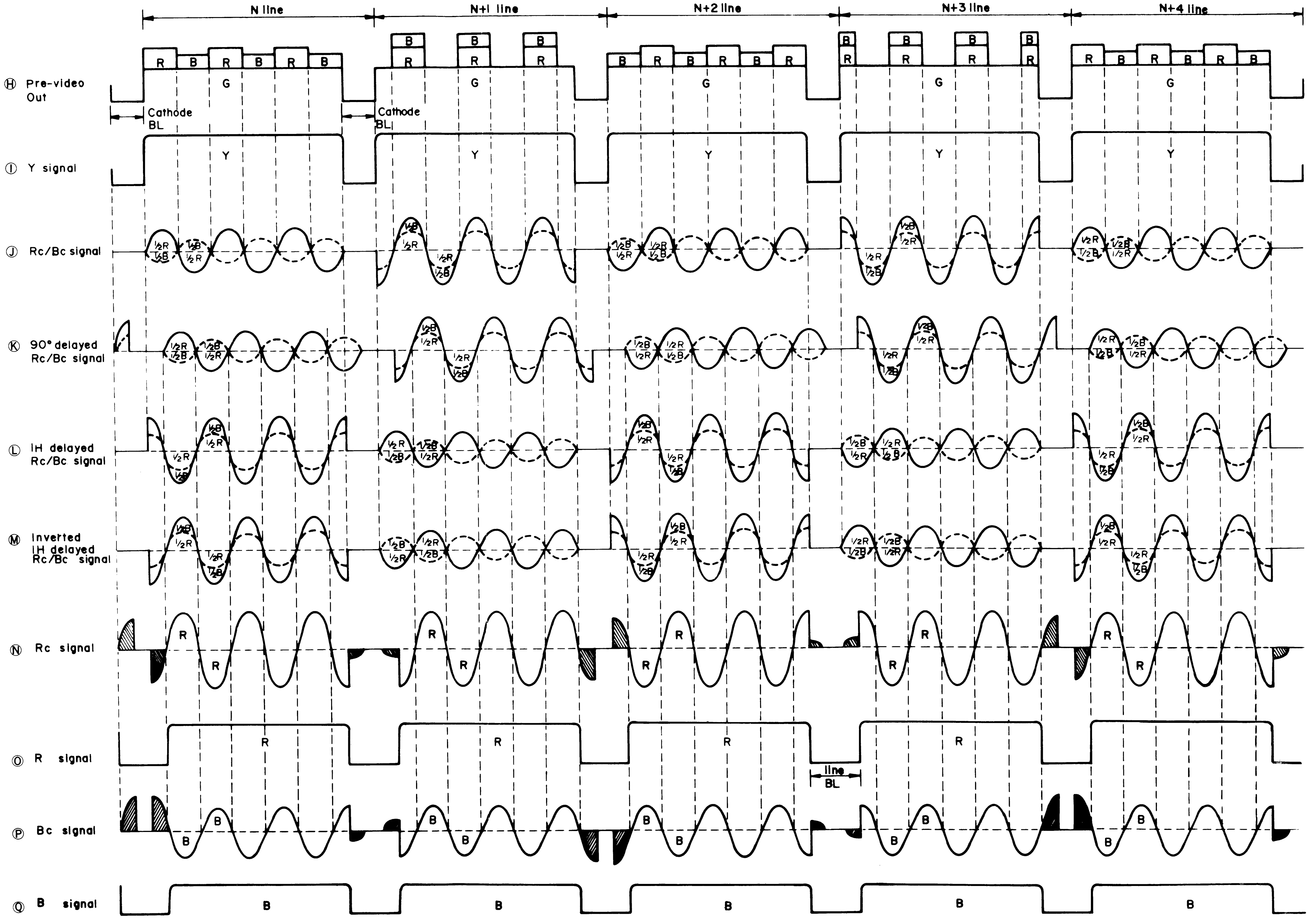
The amplified signal Ⓗ is also supplied to the band-pass-filter (B.P.F.) whose center frequency is 4.3MHz and through which only the 4.3MHz modulated signal Ⓙ passes.

The modulated signal Ⓙ is sent to the 90° phase shift circuit and the 1H(1 line) delay circuit, from which 90° phase shifted and 1H delayed modulated signals Ⓚ and Ⓛ are obtained.

The 1H-delayed modulated signal Ⓛ is inverted and the signal Ⓜ is obtained. The modulated R(Rc) signal Ⓝ is obtained by adding the modulated signals Ⓚ and Ⓜ, and the modulated B(Bc) signal Ⓟ is obtained by subtraction of the modulated signals Ⓚ and Ⓜ. The shaded portions on the signals Ⓝ and Ⓟ are removed by mixing the line blanking pulse.

The Rc and Bc signals obtained by addition and subtraction are supplied to detectors, from which R signal Ⓞ and B signal Ⓠ are obtained. The R signal and B signal thus obtained are fed to the R-YL and B-YL modulator circuits respsectively.

The chrominance signal obtained by mixing the R-YL and B-YL modulated signals is supplied to the Y/chroma mix circuit where it is mixed with the luminance(YH) signal to result in an NTSC signal.


N line
N+1 line
N+2 line
N+3 line
N+4 line
Ⓗ Pre-video Out
Cathode BL
Ⓘ Y signal
Ⓙ Rc/Bc signal
Ⓚ 90° delayed Rc/Bc signal
Ⓛ 1H delayed Rc/Bc signal
Ⓜ Inverted 1H delayed Rc/Bc signal
Ⓝ Rc signal
Ⓞ R signal
line BL
Ⓟ Bc signal
Ⓠ B signal
R
B
G
Y
½R
½B
R
B

*Shaded portions are removed by mixing the line blanking pulse.

Fig. 1-11 Detection of Y, R and B Signals

2 Preamplifier Board (YFVPKA0702JA)

Outline

This circuit amplifies the signal current is(0.2μA-0.3μA) from the pick-up tube.

The amplified video signal is delivered to the Signal Processing circuit on the Process board.

The preamplifier is a low output impedance and negative feedback amplifier which uses a low noise FET at the input.

To maintain the low noise in the signal, a so-called Percival circuit is used. It improves the S/N ratio at relatively high frequencies (where color components are located).

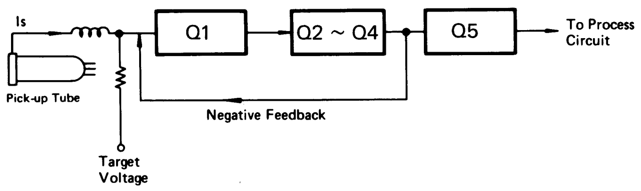

Is
Q1
Q2 ~ Q4
Q5
To Process Circuit
Pick-up Tube
Negative Feedback
Target Voltage

Fig. 2-1 Preamplifier

Details

The signal current from the pick-up tube, comprising the modulated red(R) and blue(B) components, and the green(G) component, is supplied to the target terminal of the Preamplifier circuit and converted to the video signal by R2 through L1 Percival coil. This video signal is amplified approx. 30dB by the amplifier which consists of Q1 FET and Q2. The amplified signal is then fed to Q3 and Q4 which amplify the input signal approx. 66dB.

The signal at the collector of Q4 is negatively fed back to the gate of Q1 through a feedback circuit which consists of R8, R12, C8 and C9.

The CT1 adjusts the frequency response of the feedback signal and corrects the frequency response of video signal.

The video signal whose frequency response is shaped by the negative feedback is converted to the low impedance video signal with the use of buffer Q5. It is then supplied to the Process board.

The target voltage for the pick-up tube is supplied from the Deflection board to terminal No. 4 (TARGET VOLTAGE IN) of the multi-pin connector BI1 through the Process board.

The target voltage, controlled due to the pick-up tube temperature drift, is supplied to the pick-up tube target through R17, R1 and L1.

Percival Circuit

The pick-up tube's output is a low noise signal, so that the video S/N is determined by the noise of the preamplifier.

The S/N of the modulated R and B signal is lower than that of the non-modulated signal G in the low frequency range due to effects of the pick-up tube output capacitance and the input capacitance of the preamplifier. Percival circuit is adopted to reduce the effects of these capaicitances and improve the S/N.

The beneficial effects of the Percival circuit are shown in Fig. 2-2. The equivalent circuit is also shown in Fig. 2-3.

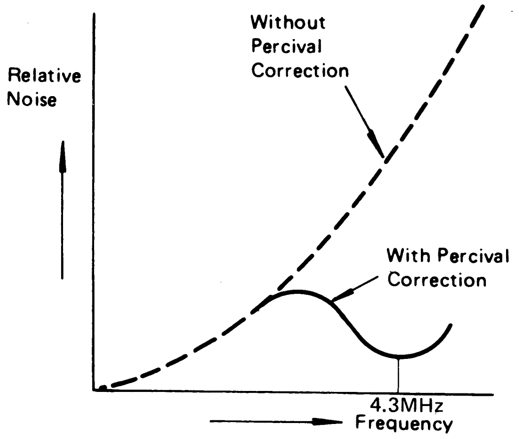


Fig. 2-2 Percival Correction

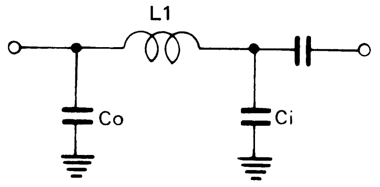


Fig. 2-3

Where : L1 ;Percival coil
Co ;Output capacitance of pick-up tube
Ci ; Input capacitance of preamp

3 Deflection Board (YFVKY4860P1A)

The Deflection Board contains following circuits.

3-1 +7.6V Regulator Circuit 11
3-2 +4.8V Regulator Circuit 12
3-3 +8.6V Regulator Circuit 12
3-4 Micro Processor Power Supply Circuit 13
3-5 Horizontal Deflection Circuit 15
3-6 Horizontal Linearity Correction Circuit 15
3-7 Vertical Deflection Circuit 16
3-8 Target Voltage Control Circuit 17
3-9 Cathode Blanking/Beam Detect Circuit...... 18
3-10 Bias Light/Lag Correction Circuit 19
3-11 High Voltage/Feedback Beam Control Circuit . 20
3-12 EVF Video Amplifier Circuit 21
3-13 EVF Vertical Deflection Circuit 21
3-14 EVF Horizontal Oscillation Circuit.......... 22
3-15 Standby Circuit......................... 22
3-16 Playback Control Circuit.................. 23

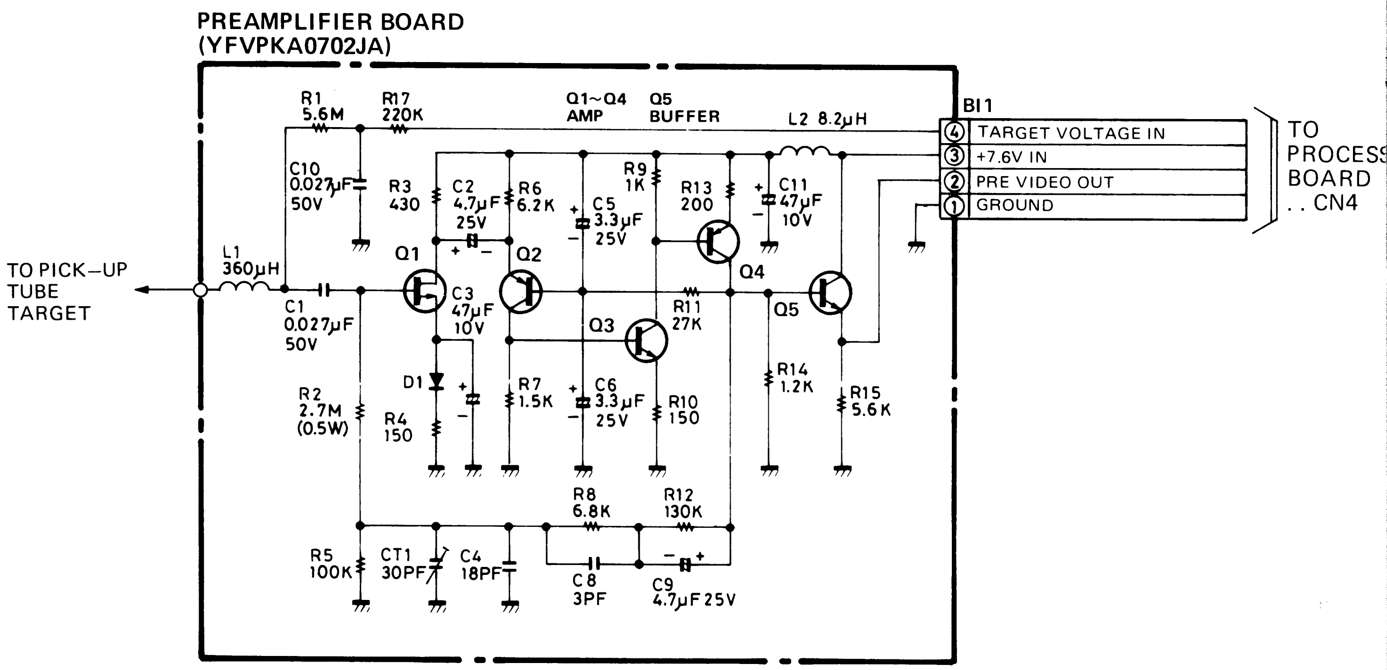

PREAMPLIFIER BOARD (YFVPKA0702JA)
TO PICK–UP TUBE TARGET
R1 5.6M
R17 220K
Q1~Q4 AMP
Q5 BUFFER
L2 8.2μH
BI1
④ TARGET VOLTAGE IN
③ +7.6V IN
② PRE VIDEO OUT
① GROUND
TO PROCESS BOARD .. CN4
C10 0.027μF 50V
R3 430
C2 4.7μF 25V
R6 6.2K
C5 3.3μF 25V
R9 1K
R13 200
C11 47μF 10V
L1 360μH
C1 0.027μF 50V
Q1
Q2
Q3
Q4
Q5
C3 47μF 10V
R11 27K
D1
R2 2.7M (0.5W)
R4 150
R7 1.5K
C6 3.3μF 25V
R10 150
R14 1.2K
R15 5.6K
R8 6.8K
R12 130K
R5 100K
CT1 30PF
C4 18PF
C8 3PF
C9 4.7μF 25V

Fig. 2-4 Preamplifier Circuit

3-1 +7.6V Regulator Circuit

Outline

The +7.6V regulator circuit consisting of IC1, Q1, Q2 and Q3 generates regulated +7.6V DC from +12V unregulated DC power from the portable VTR or the power supply unit.
This +7.6V regulator is a switching type regulator and the output voltage is controlled as;
+7.6V --- STANDBY switch is ON position
+5.0V --- STANDBY switch is STANDBY-1 & 2 position in order to save the battery life.

Details

The +12V DC power from the portable VTR or the power supply is applied through terminal No. 10 of VTR connector CN101 and terminal No. 2 of CN5 to the emitter of Q1 and Pin 1 of IC1 respectively.
+5V DC is generated inside IC1 and used as sub-power inside IC1.
Approx. 120KHz triangular signal is also generated in triangle oscillator (OSC) inside IC1 and fed to the switching amplifier inside IC1.
The reference DC voltage supplied to pin 11 of IC1 whose level is set by VR1 (+7.6V ADJ) and +7.6V output DC supplied to pin 10 of IC1 are compared by the error amplifier inside IC1. The error output DC voltage corresponding to the +7.6V DC voltage error and triangular signal supplied from triangle OSC are compared by the switching amplifier and the switching pulse output whose width is controlled by the error DC voltage appears at pin 9 of IC1.
This switching pulse is applied to the base of switching transistor Q1 switching ON and OFF Q1 through buffer Q2 and Q3.
As a result, the DC voltage whose level is set by the switching pulse width (pulse duty) is obtained at the output of switching regulator circuit consisting of Q1, D1 and L2. The generated DC voltage is fed back to pin 10 of IC1 to maintain constant output voltage. VR1 is a control for +7.6V output voltage.
The regulated +7.6V is then supplied to other circuits as a power through the filters consisting of L2/C6 and L3/C9.
The standby control section inside IC1 sends out either +5V DC voltage during STANDBY switch is ON position or 0V during STANDBY switch is STANDBY-1 & 2 position to pin 7 of IC1 depend upon supplied DC voltage at pin 5 of IC1 which is changed from +7.6V at ON position to 0V at STANDBY-1 and 2 position.
As a result, the +7.6V DC voltage drops to +5.0V by dropping reference voltage at pin 11 of IC1.

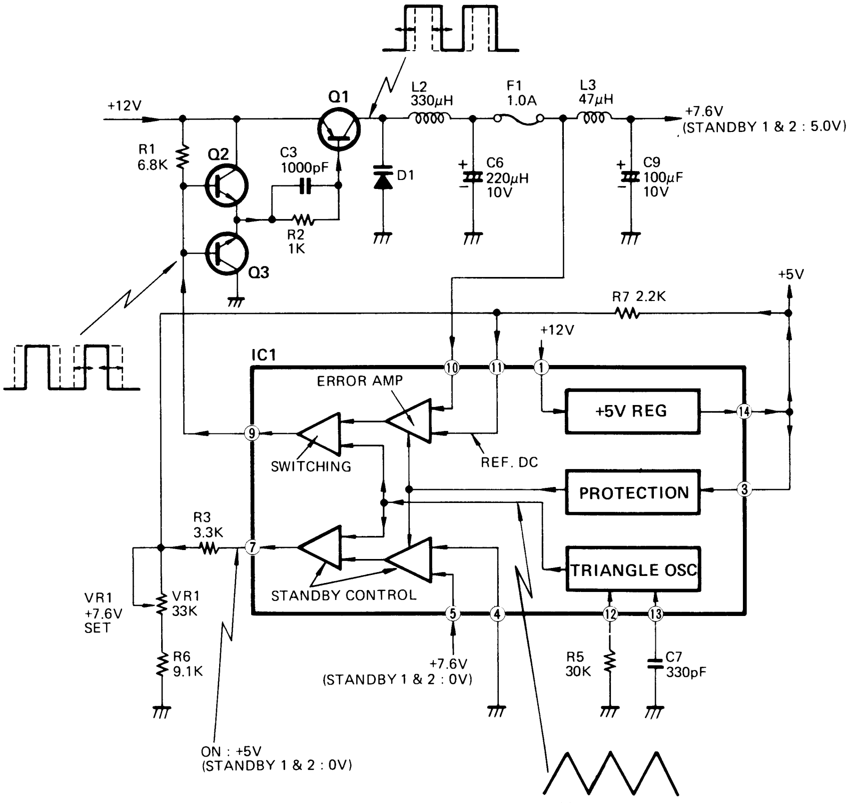

+12V
Q1
L2
330μH
F1
1.0A
L3
47μH
+7.6V
(STANDBY 1 & 2 : 5.0V)
R1
6.8K
Q2
C3
1000pF
D1
C6
220μH
10V
C9
100μF
10V
R2
1K
Q3
+5V
R7 2.2K
+12V
IC1
ERROR AMP
+5V REG
SWITCHING
REF. DC
PROTECTION
R3
3.3K
TRIANGLE OSC
STANDBY CONTROL
VR1
+7.6V
SET
VR1
33K
R6
9.1K
+7.6V
(STANDBY 1 & 2 : 0V)
R5
30K
C7
330pF
ON : +5V
(STANDBY 1 & 2 : 0V)
120KHz ~ 130KHz

Fig. 3-1 +7.6V Regulator Circuit

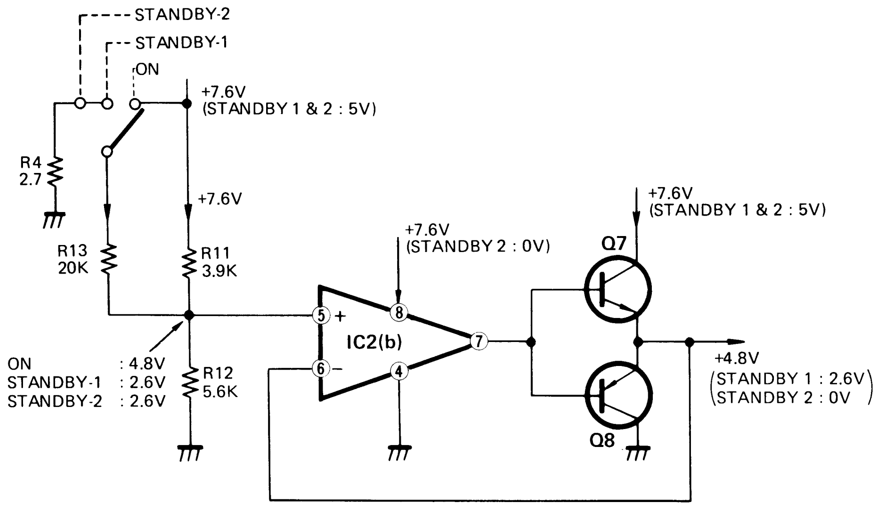

STANDBY-2
STANDBY-1
ON
+7.6V
(STANDBY 1 & 2 : 5V)
R4
2.7
+7.6V
R13
20K
R11
3.9K
+7.6V
(STANDBY 2 : 0V)
+7.6V
(STANDBY 1 & 2 : 5V)
Q7
IC2(b)
⑤ +
⑥ −
⑧
④
⑦
ON : 4.8V
STANDBY-1 : 2.6V
STANDBY-2 : 2.6V
R12
5.6K
+4.8V
(STANDBY 1 : 2.6V)
(STANDBY 2 : 0V)
Q8

Fig. 3-2 +4.8V Regulator Circuit

3-2 +4.8V Regulator Circuit

Outline

+4.8V DC is generated by regulating +7.6V generated in the +7.6V regulator circuit.

This +4.8V is used as power supply for other circuits. This +4.8V DC voltage also drops to either +2.6V at STANDBY-1 or 0V at STANDBY-2 for saving battery life.

Details

The +4.8V DC voltage is generated by regulating +7.6V DC power using IC2(b), Q7 and Q8.

The output voltage of Q7/Q8 is applied to pin 6 of IC2 to form a feedback loop, and thus stabilizing the output voltage. The reference voltage for pin 5 of IC2 is obtained by dividing the +7.6V using R11 and R12.

However the reference voltage drops at STANDBY-1 & 2 position caused by dropping +7.6V DC. Also power supply for IC2 (pin 8) becomes 0V at STANDBY-2 position.

As a result, +4.8V DC drops to either +2.6V at STANDBY-1 or 0V at STANDBY-2.

3-3 +8.6V Regulator Circuit

Outline

+8.6V DC voltage is generated from unregulated +12V DC power by IC4(b) and Q9 and this +8.6V is used as power supply for other circuits.

The +8.6V DC also drops to either +4.7V at STANDBY-1 or 0V at STANDBY-2.

Details

The +8.6V DC voltage is produced by IC4(b) and Q9 and obtained at the collector of Q9.

The output voltage is fed back to pin 5 of IC4 by dividing the +8.6V DC voltage using R14 and R15 for stabilizing the +8.6V DC output voltage. Also +4.8V regulated DC is supplied to pin 6 of IC4 for the reference voltage.

However, the +4.8V DC voltage is changed to either +2.6V at STANDBY-1 or 0V at STANDBY-2. Therefore +8.6V DC voltage is also changed to either +4.7V at STANDBY-1 or 0V at STANDBY-2.

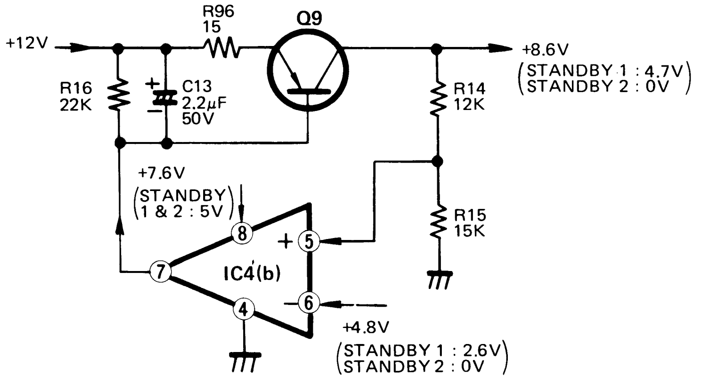

R96
15
Q9
+12V
R16
22K
C13
2.2μF
50V
+8.6V
(STANDBY 1 : 4.7V)
(STANDBY 2 : 0V)
R14
12K
+7.6V
(STANDBY 1 & 2 : 5V)
⑧
+⑤
⑦
IC4(b)
④
−⑥
R15
15K
+4.8V
(STANDBY 1 : 2.6V)
(STANDBY 2 : 0V)

Fig. 3-3 +8.6V Regulator Circuit

3-4 Micro Processor Power Supply Circuit

Outline

This circuit consisting of Q5 and Q6 produces +5V DC voltage at the STANDBY switch is ON, +4.3V at STANDBY-1 & 2 for the power supply of the micro processor. Also, the back-up battery DC-DC converter circuit consisting of Q12, Q13 and Q40 generates approx. +3.4V DC voltage from +1.5V dry battery which called back-up battery and supplies it to the micro processor as a power source in order to maintain the calendar function of the micro processor during no +12V DC power is supplied.

The CPU reset pulse generator Q11 generates a reset pulse for the micro processor and the back-up battery warning circuit IC4(a) produces the back-up battery warning signal and sends it to micro processor board in order to indicate the back-up battery level which becomes too low.

When the new (full charged) +1.5V back-up battery is installed, the back-up battery DC-DC converter circuit may be worked up to approx. 1 year.

Details

When the STANDBY SW is placed ON position, +7.6V DC voltage is applied to the collector of Q6, +5V DC voltage is sent to the base of Q5 and +4.8V DC voltage is fed to the collector of Q5 and Q5 & Q6 turn ON. Therefore, +5V DC voltage obtained at the emitter of Q6 is sent to the micro processor as a power source. However, +7.6V DC drops to +5V when the STANDBY SW is placed STANDBY-1 & 2 and +4.8V DC drops to +2.6V at STANDBY-1 and 0V at STANDBY-2. As a result, +5V DC obtained at the emitter of Q6 drops to +4.3V at STANDBY-1 & 2.

When the +12V DC power from the VTR or power supply unit is turned OFF, the back-up battery DC-DC converter oscillates approx. 200 - 300KHz by Q13, C15, R21, T2 and the stray capacitance using +1.5V dry battery and boosts it by T2.

The boosted switching pulse obtained at pin 2 of T2 is rectified by D3 and converted it to +3.4V DC by C10. This +3.4V DC is supplied to the micro processor to maintain its calendar function during no +12V DC power is supplied.

However, the +3.4V DC voltage drifts according to the 1.5V back-up battery voltage. Therefore the voltage regulator Q12, D2, R20 and R91 controls the base bias voltage of Q13 to control the ON/OFF duty of Q13 to keep +3.4V DC voltage constant.

On the other hand, when +12V DC is supplied to the camera, +5V or +4.3V DC is fed to D2 from the emitter of Q6 and D2 & Q12 are turned ON. The base of Q13 is connected to ground by Q12, Q13 is turned OFF and oscillation is stopped.

But, when no +12V DC is supplied to camera and +1.5V back-up battery is completely discharged, the new +1.5V back-up battery is then installed, approx. 5 - 10 times more current flow to the micro processor compare to normal back-up mode due to the micro processors characteristic. This case, the back-up battery DC-DC converter circuit can not supply the +3.4V DC to the micro processor because of small capacity of output current. Therefore the base of Q40 is low and Q40 is turned OFF to stop the oscillation by cutting the base bias voltage of Q13.

The Q11 generates the CPU reset pulse when the back-up battery is replaced and +12V DC power is then supplied to the camera. This case, the micro processor is reset by the CPU reset pulse. All information such as calendar, title 1, 2 and 3, automatic white balance (AWC) level etc. is cleared.

IC4(a) compares the +1.5V back-up battery voltage and the reference voltage divided +7.6V using R22 and R23. When the back-up battery voltage is higher than 1.1V, the output voltage at pin 1 of IC4 is low(L) and this is sent to micro processor board as the information of which the battery level is OK. But the back-up battery is discharged and its voltage becomes lower than 1.1V, the output of IC4 changes high(H) and this is sent to micro processor board for blinking the tape counter is blinking instead of the title color character on the electronic viewfinder (EVF).

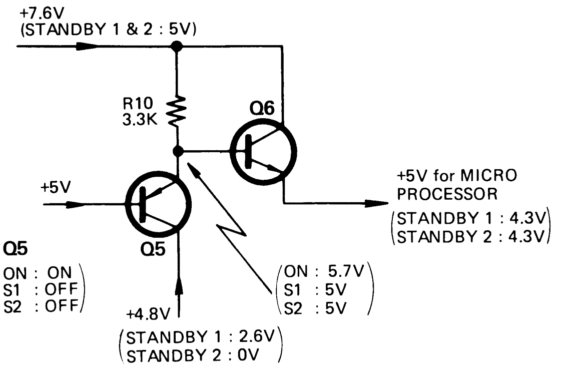

+7.6V
(STANDBY 1 & 2 : 5V)
R10
3.3K
Q6
+5V
Q5
+5V for MICRO PROCESSOR
(STANDBY 1 : 4.3V
STANDBY 2 : 4.3V)
Q5
(ON : ON
S1 : OFF
S2 : OFF)
+4.8V
(STANDBY 1 : 2.6V
STANDBY 2 : 0V)
(ON : 5.7V
S1 : 5V
S2 : 5V)

Fig. 3-4-1 Power Supply for Micro Processor

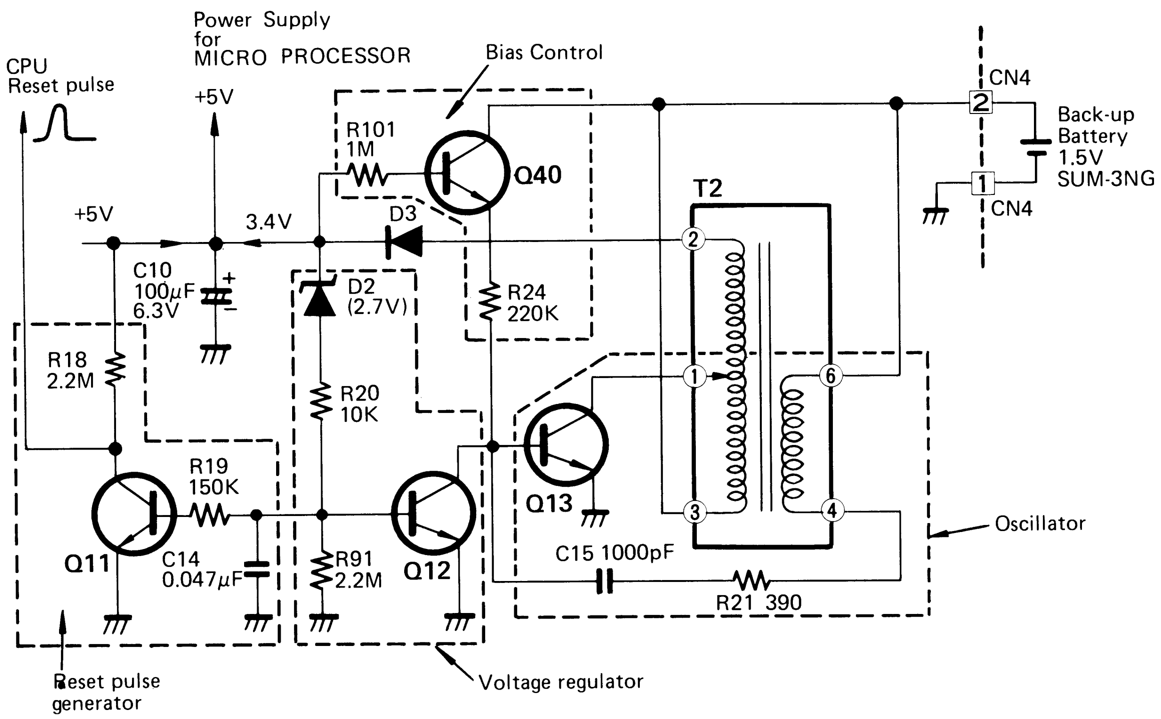

CPU
Reset pulse
Power Supply
for
MICRO PROCESSOR
+5V
Bias Control
CN4
2
Back-up
Battery
1.5V
SUM-3NG
1
CN4
R101
1M
Q40
T2
+5V
3.4V
D3
C10
100μF
6.3V
D2
(2.7V)
R24
220K
R18
2.2M
R20
10K
R19
150K
Q13
Q11
C14
0.047μF
R91
2.2M
Q12
C15 1000pF
R21 390
Oscillator
Reset pulse
generator
Voltage regulator

Fig. 3-4-2 Back-up Battery DC-DC Converter Circuit

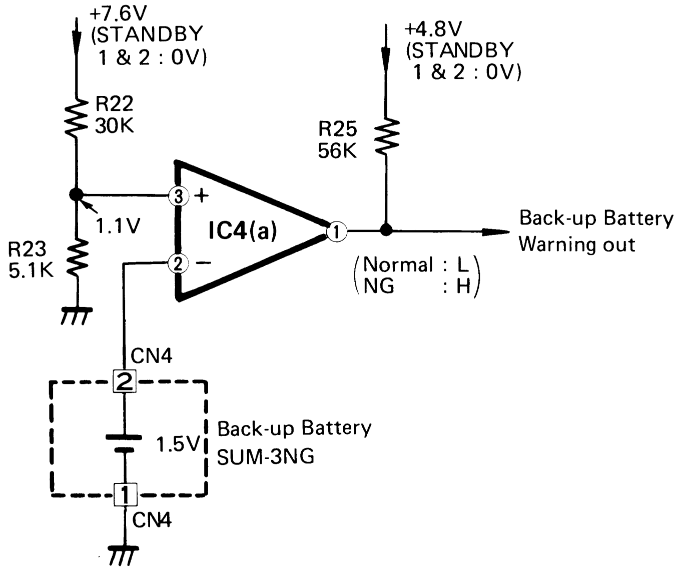

+7.6V
(STANDBY
1 & 2 : 0V)
R22
30K
+4.8V
(STANDBY
1 & 2 : 0V)
R25
56K
3
+
1.1V
IC4(a)
1
2
–
R23
5.1K
Back-up Battery
Warning out
(Normal : L
NG : H)
CN4
2
1.5V
Back-up Battery
SUM-3NG
1
CN4

Fig. 3-4-3 Back-up Battery Warning Circuit

3-5 Horizontal Deflection Circuit

Outline

This circuit generates the sawtooth current for the horizontal(H) beam deflection inside the pick-up tube, supplying it to the pick-up tube H. deflection coil.

Details

The horizontal scanning start(Hs) pulse supplied from the Process board goes via inverter Q15 to horizontal deflection output Q16. When Q16 is switched ON by the Hs pulse from Q15, the collector current pulse at Q16 resonates with L4 and C20, and the resultant horizontal sawtooth current is generated and supplied to the pick-up tube horizontal deflection coil through terminal No. 2 of CN3.

VR2 (H. SIZE) is a control for adjusting the horizontal scanning size.

3-6 Horizontal Linearity Correction Circuit

Outline

The horizontal (H) deflection circuit is of a switching type, so that the generated sawtooth current waveform has poor linearity. By feeding the sawtooth current to the deflection coil, the intensity of the magnetic field generated in the deflection coil is not linear as the pick-up tube's electron beam is deflected.

If a linear sawtooth current (A) is sent to the deflection coil, however, the magnetic field in the scanning start portion is distorted (B) due to the effect of the pick-up tube's electrodes, coil hysterisis, etc. As a result, the linearity of the scanning start portion deteriorates, and a shading (unevenness of amplitude) appears on the left edge of the picture.

Therefore, in order to generate a linear magnetic field intensity (D) and to correct the linearity and shading of the scanning start portion, it is necessary to feed a nonlinear sawtooth signal (C) to the deflection coil. This circuit generates a waveform to correct the linearity of horizontal sawtooth current waveform and its starting portion.

The horizontal deflection circuit is connected to one end of the horizontal deflection coil, and the horizontal linearity correction circuit to the other end.

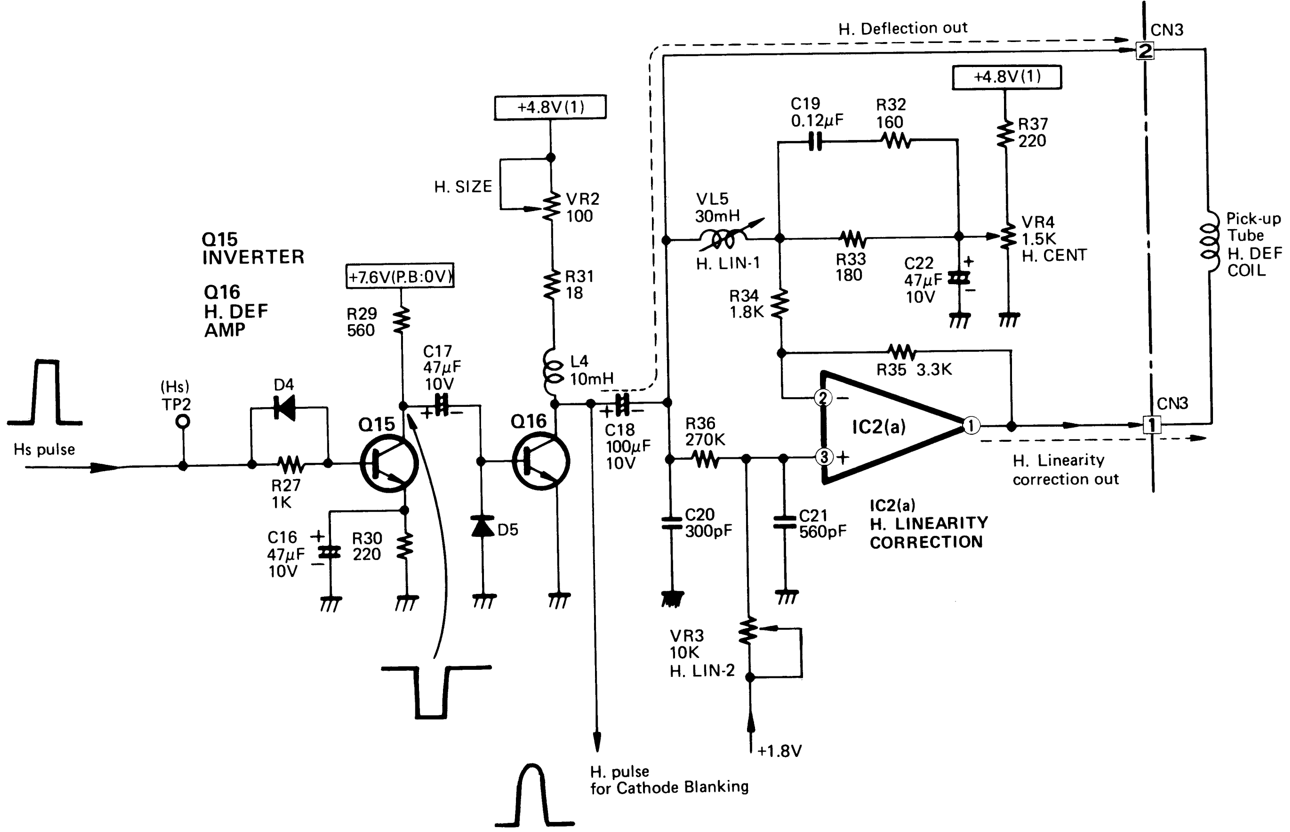

Hs pulse
(Hs)
TP2
D4
R27
1K
Q15
INVERTER
Q16
H. DEF
AMP
+7.6V(P.B:0V)
R29
560
C17
47µF
10V
C16
47µF
10V
R30
220
D5
Q15
Q16
+4.8V(1)
H. SIZE
VR2
100
R31
18
L4
10mH
C18
100µF
10V
H. pulse
for Cathode Blanking
H. Deflection out
VL5
30mH
H. LIN-1
C19
0.12µF
R32
160
+4.8V(1)
R37
220
R33
180
C22
47µF
10V
VR4
1.5K
H. CENT
R34
1.8K
R35 3.3K
R36
270K
C20
300pF
C21
560pF
IC2(a)
IC2(a)
H. LINEARITY
CORRECTION
VR3
10K
H. LIN-2
+1.8V
H. Linearity
correction out
CN3
CN3
Pick-up
Tube
H. DEF
COIL

Fig. 3-5 Horizontal Deflection Circuit

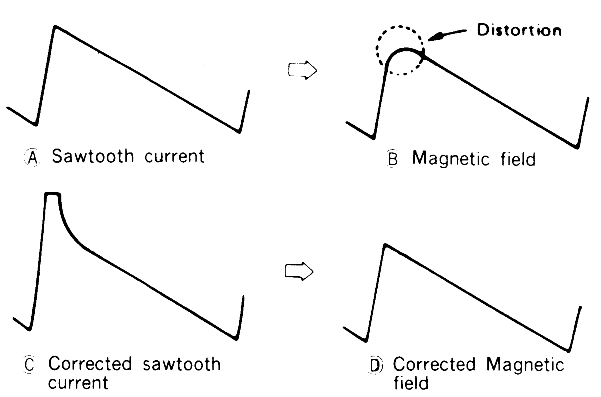

Distortion
Ⓐ Sawtooth current
Ⓑ Magnetic field
Ⓒ Corrected sawtooth current
Ⓓ Corrected Magnetic field

Fig. 3-6-1 Horizontal Linearity Correction-1

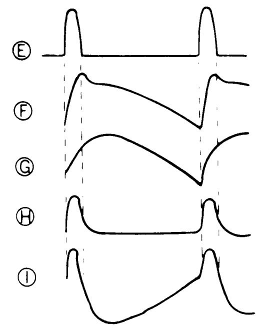


Fig. 3-6-2 Horizontal Linearity Correction-2

Details

The horizontal(H) pulse (E) produced from the collector of Q16 in the H. deflection circuit is integrated by VL5 and R33 into a sawtooth signal (F).

This sawtooth signal is again integrated by VL5, R32 and C19 into a parabola signal (G), which is applied through R34 to pin 2 of differential amplifier IC2 (a) as a H. linearity correction signal.

The H. pulse (E) from Q16 is integrated by R36 and C21 into a linearity correction signal (H) for correcting the linearity of the starting portion of the horizontal sawtooth current waveform. The starting portion linearity correction signal (H) is applied to pin 3 of IC2 where the linearity correction signal (G) and the starting portion linearity correction signal (H) are mixed and amplified. The mixed signal (I) of these linearity correction signals at pin 1 of IC2 is fed to the H. deflection coil to correct the linearity of the horizontal sawtooth current waveform.

VL5 (H. LIN-1) is a control for adjusting the overall linearity of sawtooth current.

VR3 (H. LIN-2) is a control for adjusting the linearity of the starting portion.

VR4 (H. CENTERING) is a centering control which controls the negative input potential of IC2 to change the direct current flowing to the H. deflection coil, and thus sets the horizontal scanning position on the pick-up tube.

3-7 Vertical Deflection Circuit

Outline

This circuit generates a sawtooth current for the vertical(V) beam deflection inside the pick-up tube, feeding it to the pick-up tube V. deflection coil.

Details

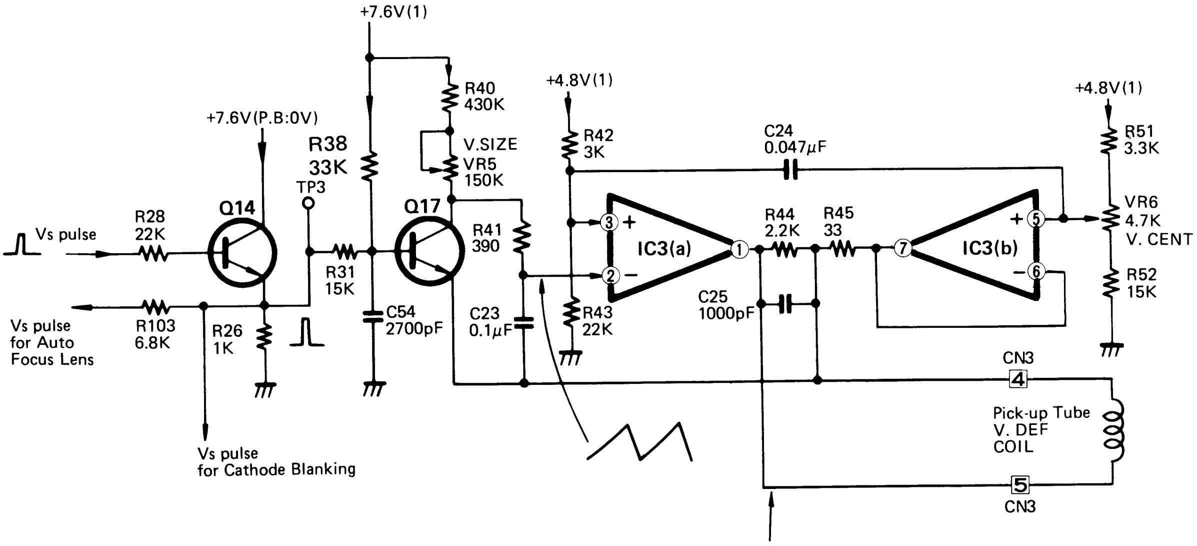
The vertical scanning start(Vs) pulse sent from the Process board is fed to sawtooth generator Q17 through buffer Q14 which converts it into a vertical rate sawtooth.

This sawtooth signal is applied to pin 2 of amplifier IC3, which produces an amplified vertical sawtooth signal from its output pin 1. This amplified signal is sent to the pick-up tube vertical deflection coil.

The sawtooth current flowing to the vertical deflection coil is detected by R45 which is connected in series with the deflection coil, and fed back to sawtooth generator Q17, thus correcting the linearity of the vertical sawtooth waveform. Therefore, a linear sawtooth current flows into the pick-up tube vertical deflection coil.

VR5 (V.SIZE) is the control for the amplitude of the vertical deflection sawtooth waveform to set vertical scanning size.

VR6 (V. CENTERING) is a centering control which controls the direct current flowing to the vertical deflection coil through buffer IC3(b) to set the vertical scanning position on the pick-up tube.



+7.6V(1)
R40
430K
+4.8V(1)
+4.8V(1)
+7.6V(P.B:0V)
R42
3K
C24
0.047μF
R51
3.3K
R38
33K
V.SIZE
VR5
150K
TP3
VR6
4.7K
V. CENT
R28
22K
Q14
Q17
R41
390
R44
2.2K
R45
33
Vs pulse
IC3(a)
IC3(b)
R31
15K
R52
15K
Vs pulse for Auto Focus Lens
R103
6.8K
R26
1K
C54
2700pF
C23
0.1μF
R43
22K
C25
1000pF
CN3
4
Pick-up Tube V. DEF COIL
5
CN3
Vs pulse for Cathode Blanking

Fig. 3-7 Vertical Deflection Circuit

3-8 Target Voltage Control Circuit

Outline

Each pick-up tube has optimum target voltage to produce the best performance. The optimum target voltage for the Newvicon® varies according to the Newvicon® temperature.

The target voltage control circuit detects the Newvicon®'s temperature variation, and controls the target voltage according to the temperature drift to meet the optimum target voltage.

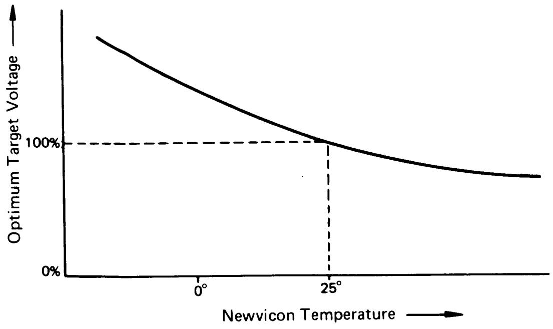


Fig. 3-8-1 Optimum Target Voltage of Newvicon®

Details

The deflection coil assembly has a built-in temperature detecting thermistor which is connected between terminal No. 3 of CN3 and ground.

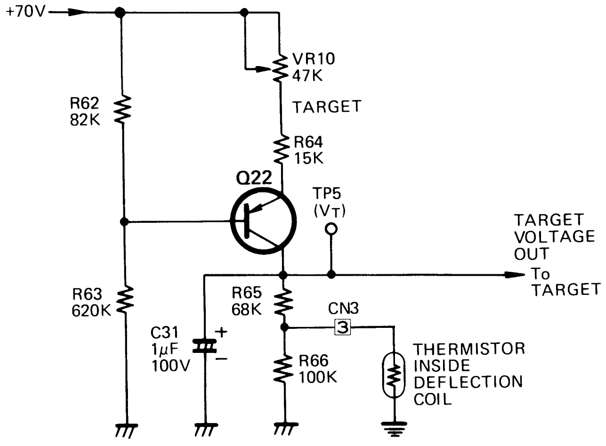
When the inside temperature of the deflection coil assembly changes (it also changes in the Newvicon®) the thermistor resistance, the collector current of DC amplifier Q22 is changed and this changes the collector voltage of Q22.

The target voltage applied to the Newvicon® is set by VR10 (TARGET).

If the temperature goes up, the resistance of the thermistor decreases so that the total resistance connected between the collector of Q22 and ground decreases. Accordingly, the collector potential of Q22 falls, and the target voltage which is set by VR10 is reduced.

In this way, the target voltage is kept optimum according to temperature variations.

When the temperature falls, the reverse operation takes place.



+70V
VR10
47K
TARGET
R62
82K
R64
15K
Q22
TP5
(VT)
TARGET VOLTAGE OUT
To TARGET
R63
620K
R65
68K
CN3
3
C31
1μF
100V
R66
100K
THERMISTOR INSIDE DEFLECTION COIL

Fig. 3-8-2 Target Voltage Control Circuit

3-9 Cathode Blanking/Beam Detect Circuit

Cathode Blanking Circuit

Outline

This circuit generates a cathode blanking pulse and supplies it to the pick-up tube cathode(K) in order to eliminate the retrace scanning lines.

Details

The horizontal(H) pulse at the collector of H.deflection output Q16 and the vertical scanning start (Vs) pulse from the Process board through inverter Q18 and Q19 are supplied to base of the switching amplifier Q20 respectively.

The mixed signal obtained at the emitter of Q20 is supplied to the cathode(K) of pick-up tube through terminal No. 4 of BI1 as a cathode blanking pulse.

Beam Detect Circuit

Outline

This circuit detect the current flow from the pick-up tube cathode (K) and generate the control signal. This control signal is then fed to the Audio/Lens Control board to control the automatic iris control (AIC) lens and automatic white balance control (AWC) circuit in Micro processor board.

Details

When the power switch is initially turned ON, it takes some times for cathode of the pick-up tube to be heated sufficiently in order to emit electrons at full force. Therefore, during initial period of the time after turn ON the power switch, no current flow from the cathode (K) of the pick-up tube to Q20 and no DC bias apply to the base of Q21 thus Q21 stays OFF and potential at the collector of Q21 stays high(H).

This high potential at the collector of Q21 is fed to the Audio/Lens Control board to set the automatic iris control (AIC) lens to close iris position in order to protect the pick-up tube from the burning. (Refer to Automatic Iris Control circuit in Audio/Lens Control board.)

Also this high potential supplied to the Micro processor board inhibits the automatic white balance control (AWC) circuit in the micro processor. (Refer to Auto White Balance Control circuit in Micro processor board.)

After the pick-up tube warm up, current flows from the cathode normally then DC bias obtained at the base of Q21 to turn Q21 ON and potential at the collector of Q21 becomes low (L).

This low potential is supplied to the Micro processor board to operate AWC circuit normally and the Audio/-Lens Control board to operate AIC lens.

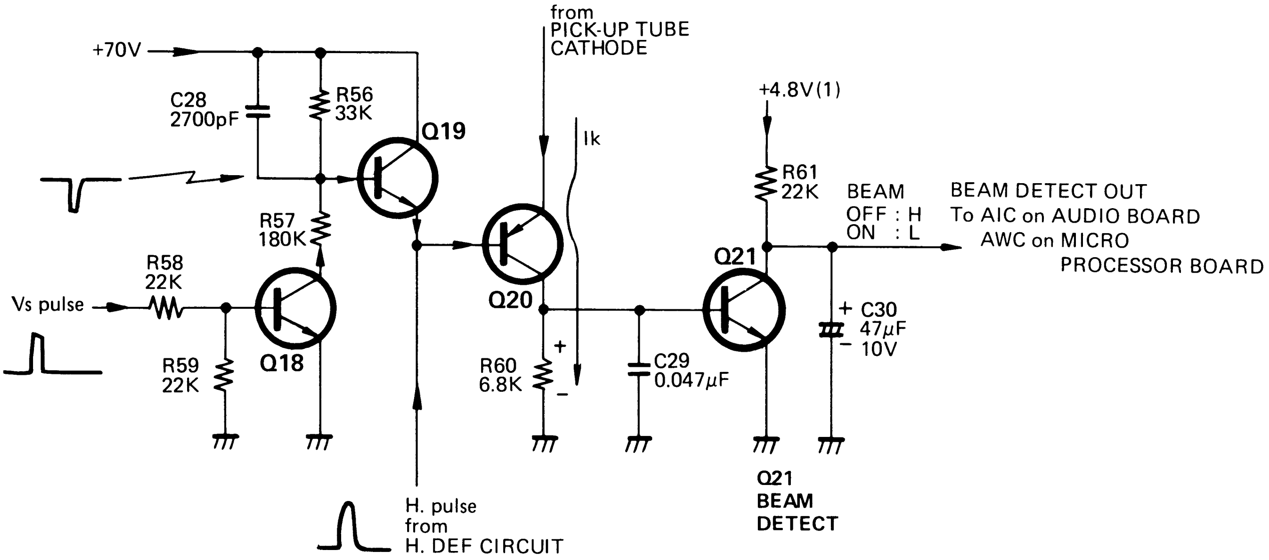

+70V
C28
2700pF
R56
33K
Q19
R57
180K
R58
22K
Vs pulse
R59
22K
Q18
from
PICK-UP TUBE
CATHODE
Ik
Q20
R60
6.8K
+
_
C29
0.047μF
+4.8V(1)
R61
22K
BEAM
OFF : H
ON : L
Q21
+ C30
47μF
- 10V
BEAM DETECT OUT
To AIC on AUDIO BOARD
AWC on MICRO
PROCESSOR BOARD
Q21
BEAM
DETECT
H. pulse
from
H. DEF CIRCUIT

Fig. 3-9 Cathode Blanking and Beam Detect Circuit

3-10 Bias Light/Lag Correction Circuit

Bias Light Circuit

Outline

The pick-up tube produces dark current when the light is blocked by capping the lens for example.
The dark current of Newvicon® is extremely small comparing with vidicon. Therefore, when the camera is aimed at the dark scene, potential at the photoconductive(target) layer of Newvicon® becomes lower than that of vidicon and the electron beam becomes insufficient to discharge the target. As a result, the beam does not respond to the variation of incoming light intensity to the Newvicon® and lag increases. (When a moving object is shot, or when the camera is panned, a trailing image is exhibited. This trailing image is called lag.)
In order to minimize the lag, bias light LEDs are positioned at the rear portion of pick-up tube for increasing the light intensity of the Newvicon®.

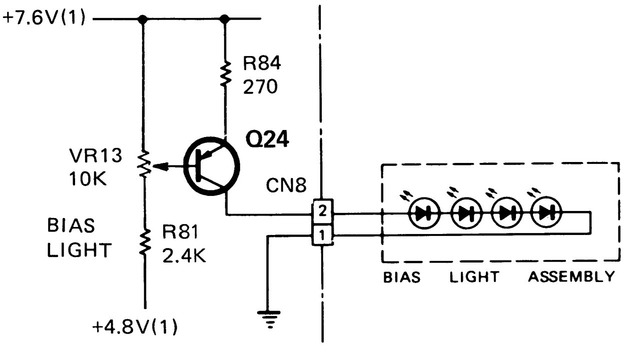

+7.6V(1)
R84
270
Q24
VR13
10K
CN8
2
1
BIAS
LIGHT
R81
2.4K
BIAS LIGHT ASSEMBLY
+4.8V(1)

Fig. 3-10-1 Bias Light Circuit

Details

The DC current adjusted by VR13(BIAS LIGHT) flows into bias light LEDs in the bias light assembly through Q24 and pin 2 of CN8 to light them in order to keep the light intensity of the pick-up tube to certain level. VR13 adjusts the brightness of LEDs.

Lag Correction Circuit

Outline

In order to minimize the lag, prevideo signal supplied from process board is applied to cathode of pick-up tube in order to rise the potential of photoconductive layer relatively by positive feedback the lag correction signal to cathode.

Details

The prevideo signal fed from process board is fed to the base and collector of white suppressor Q30 and the white suppressed prevideo signal is amplified and inverted by Q31. The amplified video signal is then mixed with cathode blanking signal and supplied to cathode through D7 and Q20.

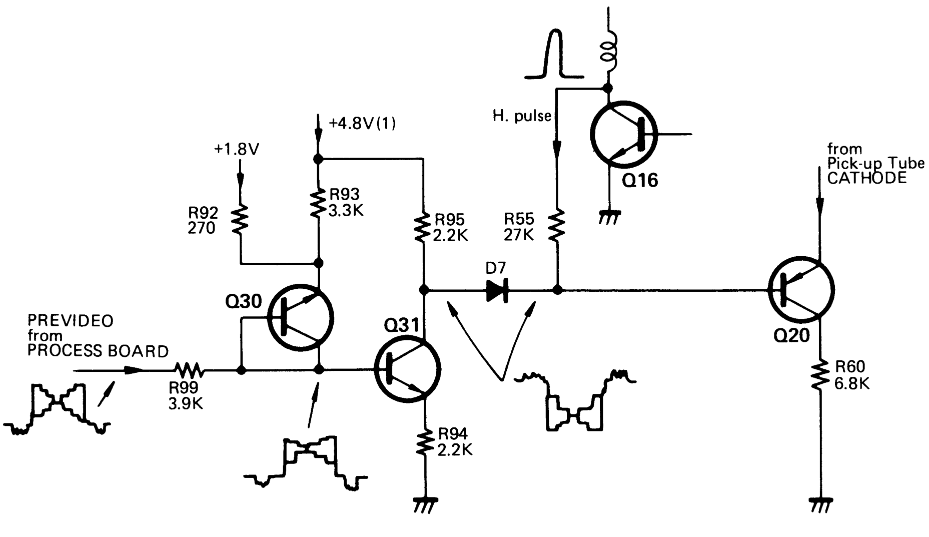

H. pulse
Q16
+4.8V(1)
+1.8V
R93
3.3K
R92
270
R95
2.2K
R55
27K
from
Pick-up Tube
CATHODE
D7
Q30
Q31
Q20
PREVIDEO
from
PROCESS BOARD
R99
3.9K
R94
2.2K
R60
6.8K

Fig. 3-10-2 Lag Correction Circuit

3-11 High Voltage/Feedback Beam Control Circuit

High Voltage Circuit

Outline

This circuit generates high voltages needed for the pick-up tube.

Details

The pre-blanking(PRE BL) pulse generated in the Process board is supplied to the primary winding of step-up transformer in high voltage pack T1 through inverter Q26 and driver Q27 to step up the PRE-BL pulse to necessary level.

The boosted pulses obtained at the secondary winding of step-up transformer are rectified to generate high voltages.

The high voltages are derived as follows.

The -70V obtained at pin 2 of T1 is fed to grid-1(G1) through Q28. VR14(BEAM) is a control for the beam amount of pick-up tube.

The +350V at Pin 5 of T1 is applied to grid-2(G2) directly.

The +1.5kV obtained at pin 4 of T1 is supplied to grid-6(G6).

The voltages for grid-4(G4) and grid-5(G5) are obtained by dividing +1.5kV by block resistor Z1 and VR15-(FOCUS) in Z1.

The +70V obtained at pin 1 of T1 is fed to cathode blanking circuit and target voltage control circuit.

Feedback Beam Control Circuit

Outline

The beam current adjustment is made so that there is sufficient beam current and it is to discharge the target for most intense highlights to be expected. Thus, beam current is set with a lens opening that admits three times as much light as found under the standard lighting condition. This is called the 3X beam setting.

Excessive beam current results in electron spacecharge effects near the target that acts to destroy focus and cause geometric distortion of the scanned area.

In normal camera operations, specular highlights do show up that requires more beam current than that provided by the 3X setting. These high lights occur when the camera pans across lighting fixtures, outdoor lights, auto headlights, highly polished jewelry or musical instruments. The effect of such of moving objects is a white comet tail that streams out to the left if the camera is panning to the right. The reason for this tail is that subsequent scans, after the highlight has moved off its original spot, are required to discharge the target. The more scans required to discharge the target when the longer the tail becomes.

The solution to comet-tailing is automatic beam control, which supplies extra beam current to meet the demands of those extraordinary highlights. To do this, the video signal from preamplifier is fed back to grid-1(G1) to boost pick-up tube beam current just for the duration of the highlight.

Details

The feedback beam control circuit consisting of Q32 and Q33 control the grid-1(G1) voltage using the prevideo signal fed back from Process board.

The prevideo signal fed from Process board is supplied to the emitter of Q32, but when a normal object is shot, the bias voltage for Q32 is set so that no video signal appears at the collector of Q32. When the excessive bright object is shot, the video signal corresponding to the bright object is obtained at the collector of Q32 to turn ON Q33. The potential of grid-1 becomes nearly 0V by Q33 so that extra beam current flows to minimize comet-tailing.

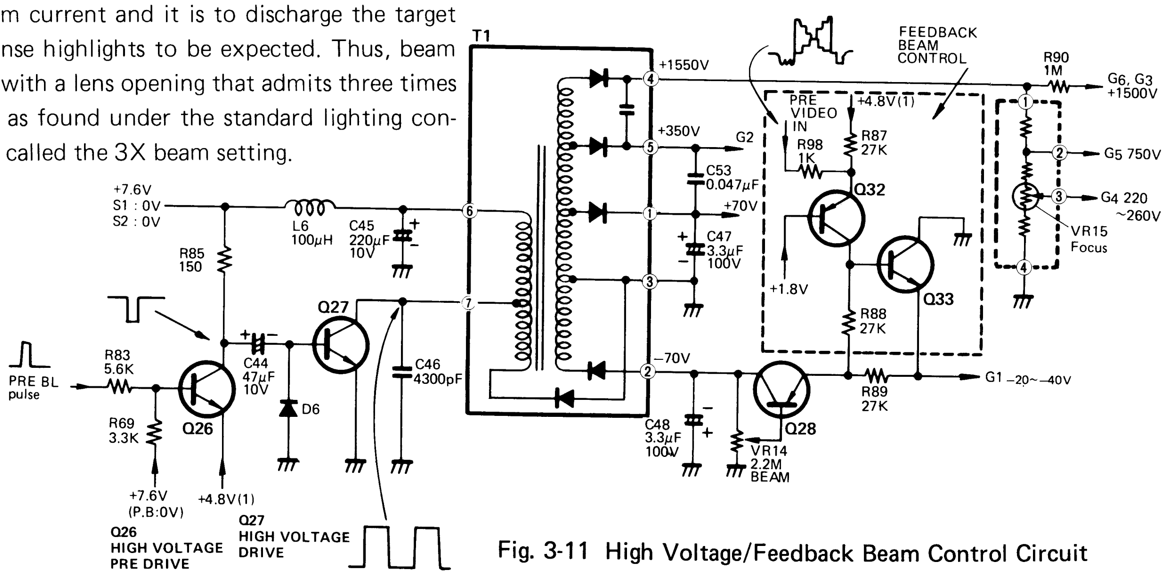

T1
+1550V
+350V
G2
+70V
-70V
+1.8V
FEEDBACK BEAM CONTROL
PRE VIDEO IN
+4.8V(1)
R98 1K
R87 27K
Q32
Q33
R88 27K
R89 27K
Q28
VR14 2.2M BEAM
C53 0.047µF
C47 3.3µF 100V
C48 3.3µF 100V
R90 1M
G6, G3 +1500V
G5 750V
G4 220 ~260V
VR15 Focus
G1 -20~-40V
+7.6V S1 : 0V S2 : 0V
L6 100µH
C45 220µF 10V
R85 150
Q27
C44 47µF 10V
D6
C46 4300pF
R83 5.6K
PRE BL pulse
R69 3.3K
Q26
+7.6V (P.B:0V)
+4.8V(1)
Q26 HIGH VOLTAGE PRE DRIVE
Q27 HIGH VOLTAGE DRIVE
①
②
③
④
⑤
⑥
⑦

Fig. 3-11 High Voltage/Feedback Beam Control Circuit

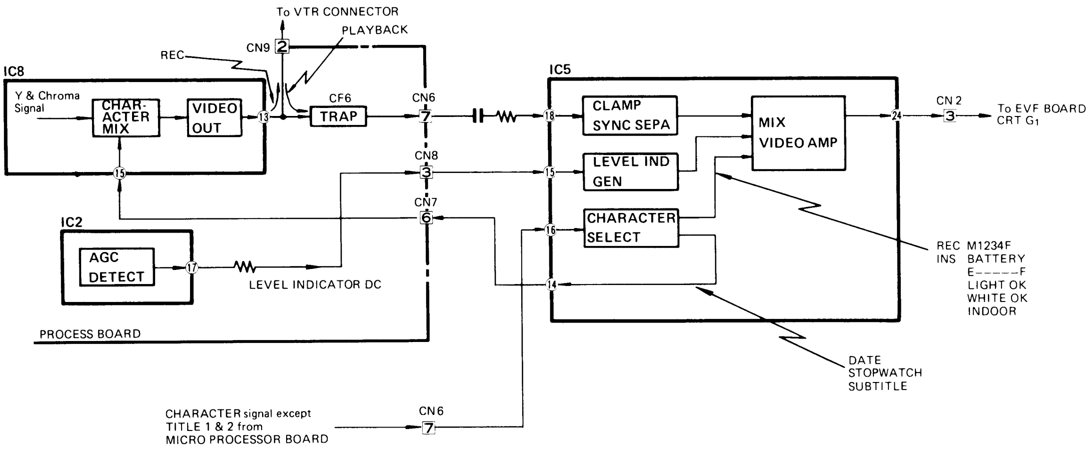

To VTR CONNECTOR
PLAYBACK
REC
CN9 2
IC8
Y & Chroma Signal
CHAR-ACTER MIX
VIDEO OUT
13
15
CF6
TRAP
CN6 7
CN8 3
CN7 6
IC2
AGC DETECT
17
LEVEL INDICATOR DC
PROCESS BOARD
IC5
18
CLAMP SYNC SEPA
15
LEVEL IND GEN
16
CHARACTER SELECT
14
MIX VIDEO AMP
24
CN 2 3
To EVF BOARD CRT G₁
REC M1234F
INS BATTERY
E-----F
LIGHT OK
WHITE OK
INDOOR
DATE
STOPWATCH
SUBTITLE
CHARACTER signal except TITLE 1 & 2 from MICRO PROCESSOR BOARD
CN6 7

Fig. 3-12 EVF Video Amplifier Circuit

3-12 EVF Video Amplifier Circuit

Outline

This circuit amplifies the video signal supplied from the Process board and feeds it to the cathode ray tube(CRT) together with the level indicator signal which indicates the video level and character signal which generated in the Microprocessor board for graphics display on the CRT screen.

Details

The NTSC signal from the Process board is applied to pin 18 of IC5 through trap CF6 which located on the Process board for removing the chrominance components in the NTSC signal. The video signal is clamped and amplified at inside IC5 then mixed with level indicator signal and character signal.
The mixed signal obtained at pin 24 of IC5 is supplied to grid-1(G1) of the CRT through VR3(CONTRAST) and amplifier Q2 in the Viewfinder board.

3-13 EVF Vertical Deflection Circuit

Outline

This circuit generates vertical deflection sawtooth current for vertical scanning of beam inside the cathode ray tube(CRT).

Details

The video signal from the Process board is supplied to the sync separator in IC5 through pin 18 of IC5.
The sync separator in IC5 detects only sync pulse of video signal and V. sync pulse is made.
The vertical(V) sync pulse generated in the sync separation circuit is fed to V. oscillator (V.OSC) inside IC5 as a trigger pulse. The V. OSC is a free-renning sawtooth generator whose frequency is approximately 50Hz. When the trigger pulse is supplied to the V.OSC circuit, it generates a 60Hz sawtooth signal.
The V. sawtooth signal obtained at pin 7 is fed to amplifier through pin 6 of IC5, where it is amplified. The amplified V. sawtooth signal at pin 5 of IC5 is fed to the CRT V. deflection coil through terminal No. 5 of CN2.
VR11 (EVF V.SIZE) is a control for vertical scanning size.
The V. sync pulse obtained at pin 13 of IC5 is supplied to Microprocessor board.

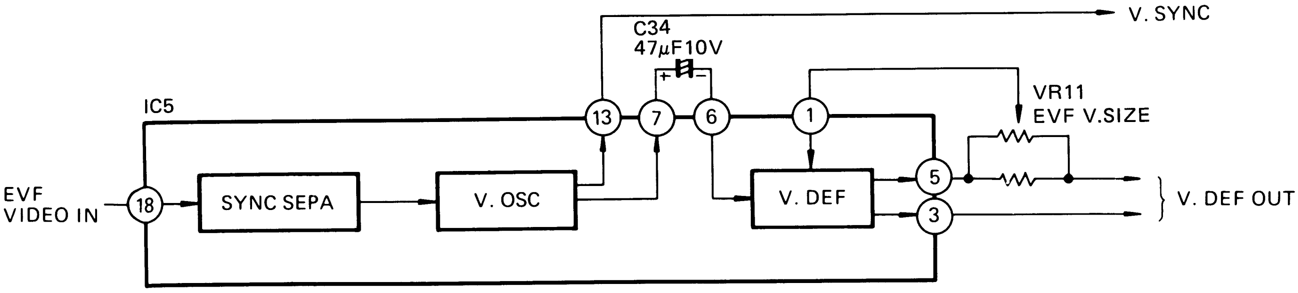

V. SYNC
C34
47μF10V
IC5
13
7
6
1
VR11
EVF V.SIZE
EVF VIDEO IN
18
SYNC SEPA
V. OSC
V. DEF
5
3
V. DEF OUT

Fig. 3-13 EVF V. Deflection Circuit

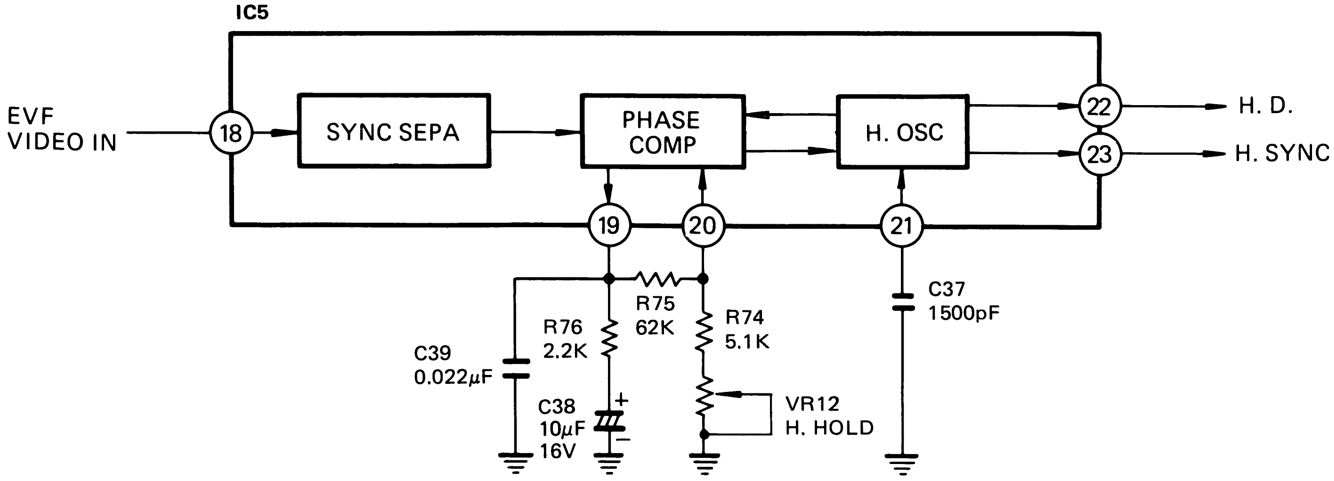


Fig. 3-14 EVF H. Oscillation Circuit

3-14 EVF H. Oscillation Circuit

Outline

This circuit controls the frequency (phase) of the horizontal sawtooth current to correspond to that of horizontal(H) sync pulse separated from video signal.

Details

The horizontal(H) sync pulse from the sync separator is applied to phase comparator inside IC5. The H. oscillation signal from the H. oscillator (H. OSC) circuit inside IC5 also is fed to phase comparator and they are compared with the H. sync pulse in phase. The DC voltage corresponding to the phase difference is fed to H.OSC to control its oscillation frequency. In this way, the H. OSC is automatically controlled to match its oscillation frequency with that of sync pulse. VR12(H.HOLD) is a control for setting the oscillation frequency in a steady state.

The frequency controlled H. drive(H.D) pulse obtained at pin 22 of IC5 is then fed to the EVF board through terminal No. 4 of CN2 to generate H. deflection sawtooth current.

The H. sync pulse obtained at pin 23 is supplied to Microprocessor board.

3-15 Standby Circuit

Outline

When recording outdoors, using camera and VTR, the power reserve of the battery must be conserved as much as possible, which is the exact function of the standby circuit.

Details

When the standby switch SW1 on the Standby board is set to ON position, practically all circuits in the camera and the VTR are operational, that is, the power sources are supplied to all electric circuits in the Deflection, Process, Micro processor, Lens and Viewfinder boards in the camera and +12V is consumed in the VTR. When the standby switch SW1 on the right side of the camera is set to STANDBY 1 position, +8.6V power source goes only to the heater of pick-up tube and cathode ray tube (CRT). At the same time a standby signal (approx. +3V) generated in Audio/Lens board is supplied to the portable VTR through pin 5 of VTR cable to set the VTR to standby position.

+5V DC power is also applied to micro processor to maintain the all micro processor functions.

When the standby switch is set to STANDBY-2 position, +5V DC power is only supplied to micro processor. All circuit except micro processor are shut off in STANDBY-2 condition.

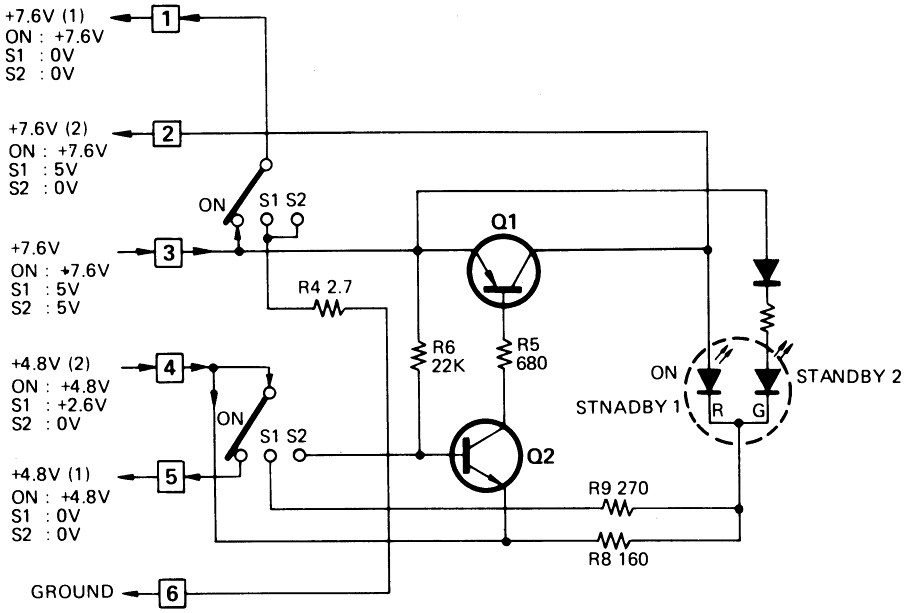

+7.6V (1)
ON : +7.6V
S1 : 0V
S2 : 0V
1
+7.6V (2)
ON : +7.6V
S1 : 5V
S2 : 0V
2
ON
S1 S2
Q1
+7.6V
ON : +7.6V
S1 : 5V
S2 : 5V
3
R4 2.7
+4.8V (2)
ON : +4.8V
S1 : +2.6V
S2 : 0V
4
ON
S1 S2
R6 22K
R5 680
ON
STNADBY 1
R
G
STANDBY 2
Q2
+4.8V (1)
ON : +4.8V
S1 : 0V
S2 : 0V
5
R9 270
R8 160
GROUND
6

Fig. 3-15 Standby Circuit

3-16 Playback Control Circuit

Outline

This circuit sense the recording or playback of the portable VTR.

When the portable VTR is set into the playback mode, this circuit shuts off horizontal(H) and vertical(V) deflection and high voltage circuits and the playback signal from the VTR is supplied to the viewfinder. When the portable VTR is set into the recording mode, this circuit sets the all circuits in the camera to operating condition and NTSC output signal is supplied to the viewfinder and the portable VTR for recording.

Details

When the portable VTR is set into the recording mode, no DC bias is applied to the emitter of Q25 and Q25 remains ON, and Q4 & Q29 are also ON so that +7.6V at the collector of Q29 is supplied to the H and V deflection, Audio/Lens Control board and high voltage circuit to function these circuits normally.

When the portable VTR is set into the playback mode, the playback signal which rides on top of +6V DC is supplied from the VTR to the playback detect circuit on Process board. +4.8V DC generated at playback board for cutting off high voltages generation and closing lens iris. In this way, the NTSC signal is not generated in the camera and the playback signal from the portable VTR is supplied to the viewfinder.

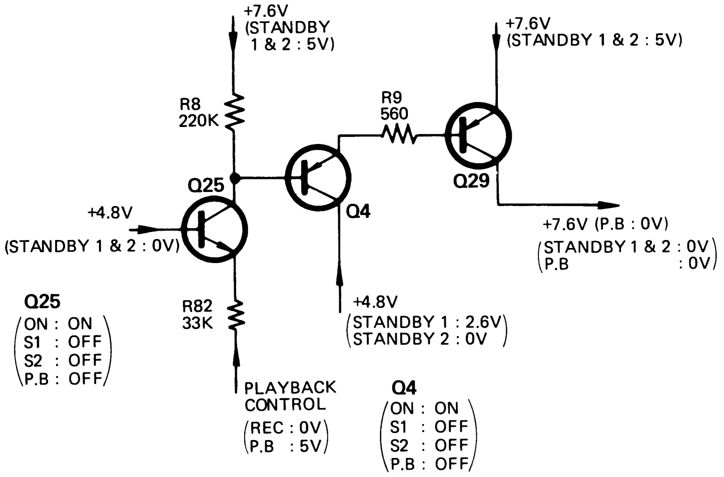

+7.6V
(STANDBY 1 & 2 : 5V)
+7.6V
(STANDBY 1 & 2 : 5V)
R8
220K
R9
560
Q25
Q4
Q29
+4.8V
(STANDBY 1 & 2 : 0V)
+7.6V (P.B : 0V)
(STANDBY 1 & 2 : 0V
P.B : 0V)
Q25
(ON : ON
S1 : OFF
S2 : OFF
P.B : OFF)
R82
33K
+4.8V
(STANDBY 1 : 2.6V
STANDBY 2 : 0V)
PLAYBACK
CONTROL
(REC : 0V
P.B : 5V)
Q4
(ON : ON
S1 : OFF
S2 : OFF
P.B : OFF)

Fig. 3-16 Playback Control Circuit

4 Process Board (YFVKZ4860P3A)

The Process Board contains following circuits.

4-1 Pulse Generator Circuit 24
4-2 Signal Processing Circuit 26
  4-2-1 Bias light Shading Correction Circuit . . . 26
  4-2-2 Optical Black Clamp Circuit 27
  4-2-3 Gamma Correction Circuit 28
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  4-2-5 Automatic Gain Control Circuit 28
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  4-5-5 Tracking Correction Circuit 37
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  4-5-7 B-Y_L Signal Circuit 40
  4-5-8 Chroma Clip Signal Circuit 40
4-6 Chrominance Encoding Circuit 41
  4-6-1 +2.5V Power Circuit 41
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  4-6-3 Chroma Clip/Suppress Circuit 42
  4-6-4 White Set Detection Circuit 42
4-7 Burst Generator Circuit 43
4-8 1/2 fH Beat Prevention Ciricut 43
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4-10 Playback Detect Circuit 48
4-11 White Balance Setting Circuit 49
4-12 VTR Remote Control/Fade Control Circuit 50
  4-12-1 VTR Remote Control Circuit 50
  4-12-2 Fade Control Circuit 51

4-1 Pulse Generator Circuit

Outline

This circuit generates all sync pulses used in the camera.

Details

The crystal oscillator which consists of crystal oscillator X1, CT5 (3.58MHz ADJ), C79 and C81 connected between pin 3 and pin 4 of sync generator IC11 oscillates 14.3MHz.
The following pulses are generated from IC11.

Pin 5 : (R-Y)SC (R-Y subcarrier)
Pin 6 : (B-Y)SC (B-Y subcarrier)
Pin 7 : PRE BL (Preblanking pulse)
Pin 8 : CP1 (Clamp pulse-1)
Pin 9 : Hs (Horizontal scanning start pulse)
Pin 10 : BFP (Burst flag pulse)
Pin 12 : Vs (Vertical scanning start pulse)
Pin 13 : BL (Composite blanking pulse)
Pin 15 : W.BL (Wide blanking pulse)
Pin 16 : Sync (Composite sync pulse)

The timing information for each pulse is shown in Fig. 4-1-1.

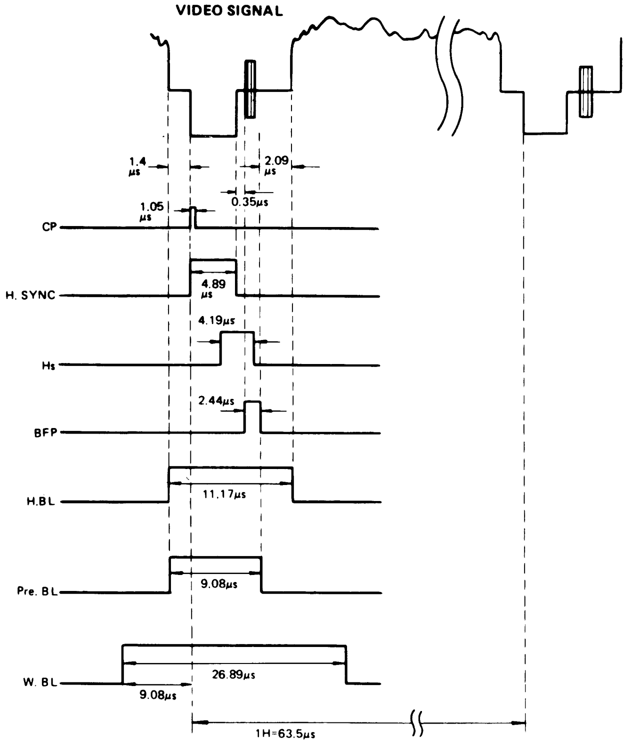


Fig. 4-1-1 Pulses

CT5 (3.58MHz ADJ) is a control for setting the subcarrier frequency. The (R-Y)SC and (B-Y)SC are respectively supplied to other circuit.

The preblanking (PRE BL) pulse is fed to other circuit. The PRE BL pulse A is mixed with the clamp pulse-1 (CP1) B and wide BL pulse (W.BL) C through R192, R191/R217 and R179/R190.

Q30 deletes the clamp pulse-1 (CP1) during vertical blanking period.

The PRE BL pulse A is also mixed with the blanking (BL) pulse E and the clamp pulse-2 (CP2) F comes from buffer Q26. The multiplexed signals D and G thus made are supplied to other circuit.

The Hs pulse H is fed to the Deflection board through buffer Q23/Q24.

The Hs pulse H at the emitter of Q23/Q24 is differentiated by C85 and R182 and clamp pulse-2 (CP2) F is made. The CP2 is fed through switching amplifier Q25 and buffer Q26 and mixed with the PRE BL pulse A and the BL pulse E as previously explained.

The vertical scanning start (Vs) pulse is supplied to the Deflection board. It is also fed to other circuit.

The wide BL (W.BL) pulse is fed to other circuit through inverter Q22.

The burst flag pulse (BFP) is fed to other circuit.

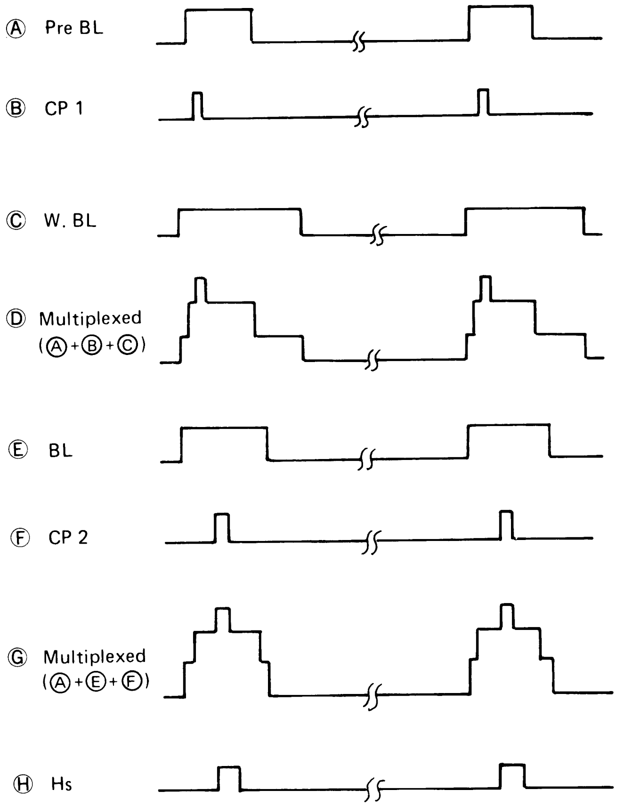

Ⓐ Pre BL
Ⓑ CP 1
Ⓒ W. BL
Ⓓ Multiplexed (Ⓐ+Ⓑ+Ⓒ)
Ⓔ BL
Ⓕ CP 2
Ⓖ Multiplexed (Ⓐ+Ⓔ+Ⓕ)
Ⓗ Hs

Fig. 4-1-3 Mixed Signals

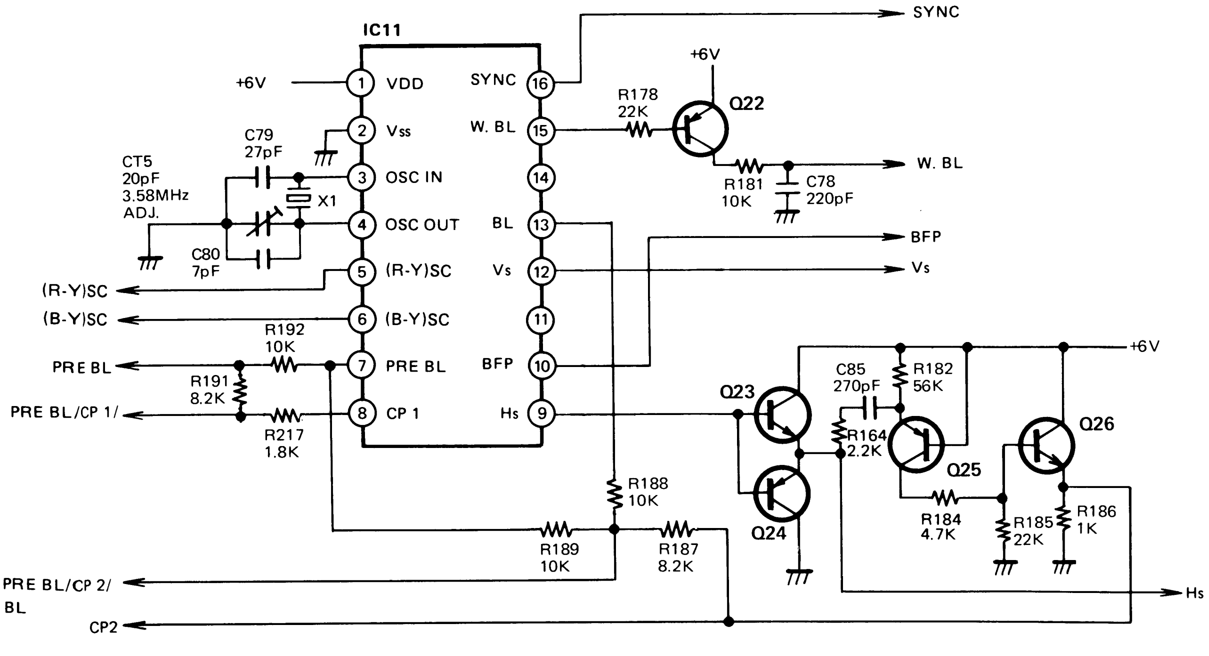

IC11
SYNC
+6V
① VDD
② Vss
③ OSC IN
④ OSC OUT
⑤ (R-Y)SC
⑥ (B-Y)SC
⑦ PRE BL
⑧ CP 1
SYNC ⑯
W. BL ⑮
⑭
BL ⑬
Vs ⑫
⑪
BFP ⑩
Hs ⑨
C79 27pF
CT5 20pF 3.58MHz ADJ.
X1
C80 7pF
(R-Y)SC
(B-Y)SC
PRE BL
PRE BL/CP 1/
R192 10K
R191 8.2K
R217 1.8K
R178 22K
Q22
R181 10K
C78 220pF
W. BL
BFP
Vs
+6V
C85 270pF
R182 56K
R164 2.2K
Q23
Q24
Q25
Q26
R188 10K
R189 10K
R187 8.2K
R184 4.7K
R185 22K
R186 1K
Hs
PRE BL/CP 2/ BL
CP2

Fig. 4-1-2 Pulse Generator Circuit

4-2 Signal Processing Circuit

This circuit contains the bias light shading correction circuit, optical black clamp circuit, gamma correction circuit, automatic iris control detection circuit and automatic gain control circuit.

4-2-1 Bias Light Shading Correction Circuit

Outline

The bias light LEDs are located on rear side of the pick-up tube for minimizing the lag by increasing the light intensity reaches the pick-up tube as described in Deflection board. But the light intensity from the bias light LEDs are not uniform in actual scanning area.

The bias light shading correction circuit equalizes the output of the pick-up tube uniformly.

The horizontal bias light shading correction signal supplied from pin 20 of IC6 (FAMOS IC) corrects the horizontal bias light shading. Also the vertical bias light shading correction signal made by VR8 and VR9 on deflection board and the bias light correction section inside IC2 on process board corrects the vertical bias light shading.

Details

The output signal of the Preamplifier board is mixed with the horizontal bias light shading correction signal supplied through R26 from pin 20 of IC6, it goes to the amplifier inside IC2 through pin 5. The amplified pre-video signal from the amplifier is mixed with the modulated preblanking (PRE BL) pulse for vertical bias light shading.

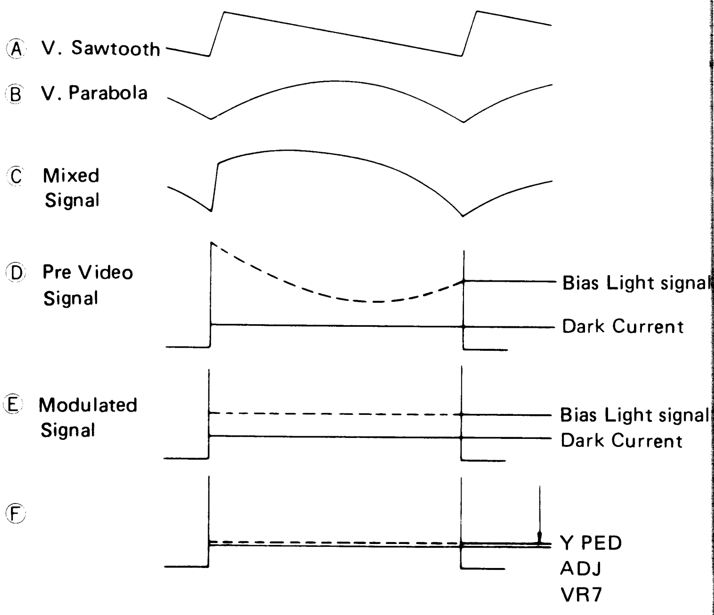

Ⓐ V. Sawtooth
Ⓑ V. Parabola
Ⓒ Mixed Signal
Ⓓ Pre Video Signal
Bias Light signa
Dark Current
Ⓔ Modulated Signal
Bias Light signal
Dark Current
Ⓕ
Y PED ADJ VR7

Fig. 4-2-1 Bias Light Correction

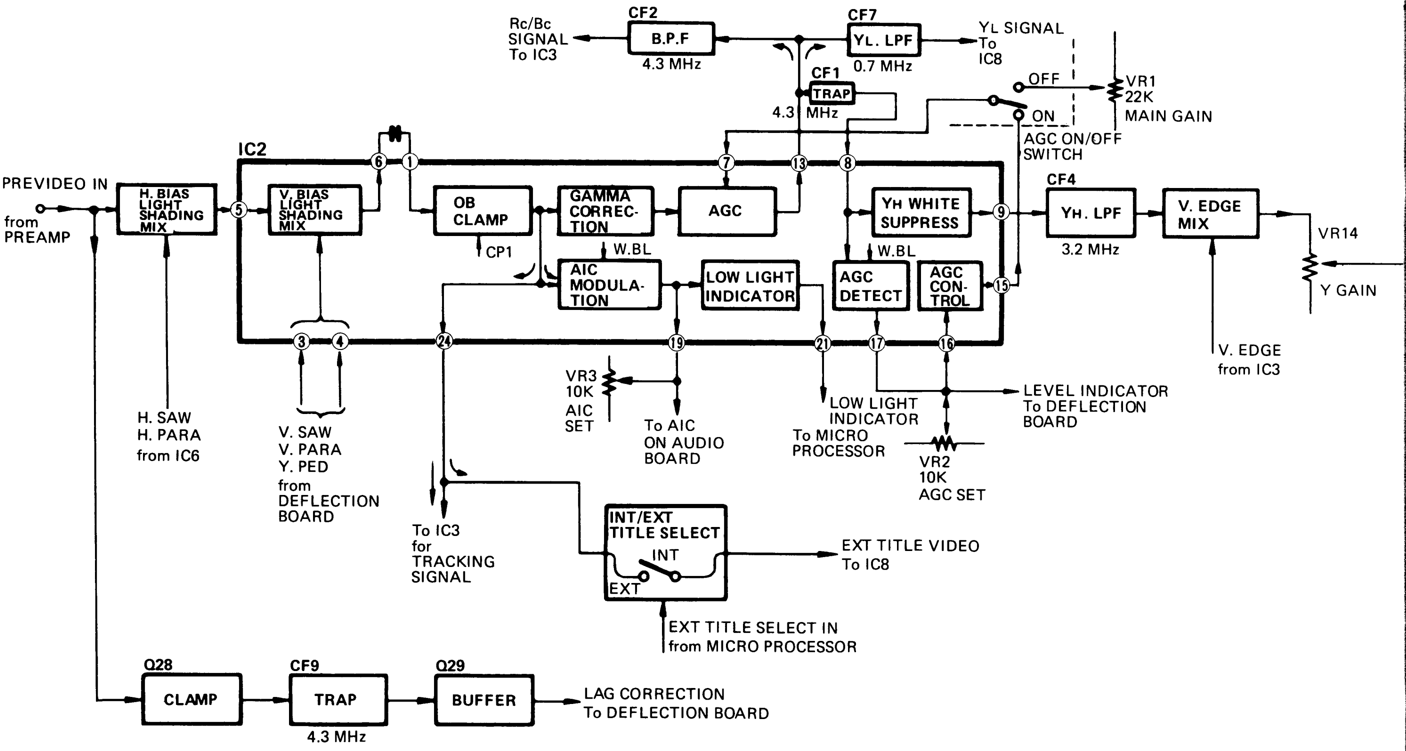

Rc/Bc SIGNAL To IC3
CF2
B.P.F
4.3 MHz
CF7
YL. LPF
0.7 MHz
YL SIGNAL To IC8
CF1
TRAP
4.3 MHz
OFF
ON
VR1 22K MAIN GAIN
AGC ON/OFF SWITCH
IC2
PREVIDEO IN from PREAMP
H. BIAS LIGHT SHADING MIX
V. BIAS LIGHT SHADING MIX
OB CLAMP
CP1
GAMMA CORREC-TION
AGC
W.BL
AIC MODULA-TION
LOW LIGHT INDICATOR
YH WHITE SUPPRESS
W.BL
AGC DETECT
AGC CON-TROL
CF4
YH. LPF
3.2 MHz
V. EDGE MIX
VR14
Y GAIN
V. EDGE from IC3
⑤ ⑥ ① ⑦ ⑬ ⑧ ⑨ ⑮ ③ ④ ㉔ ⑲ ㉑ ⑰ ⑯
H. SAW H. PARA from IC6
V. SAW V. PARA Y. PED from DEFLECTION BOARD
To IC3 for TRACKING SIGNAL
VR3 10K AIC SET
To AIC ON AUDIO BOARD
LOW LIGHT INDICATOR To MICRO PROCESSOR
LEVEL INDICATOR To DEFLECTION BOARD
VR2 10K AGC SET
INT/EXT TITLE SELECT
INT
EXT
EXT TITLE VIDEO To IC8
EXT TITLE SELECT IN from MICRO PROCESSOR
Q28
CLAMP
CF9
TRAP
4.3 MHz
Q29
BUFFER
LAG CORRECTION To DEFLECTION BOARD

Fig. 4-2-2 Signal Processing Circuit

The vertical(V) sawtooth A and parabola B signals are fed to the wiper arms of VR9 (Bs V.SAW) and VR8 (Bs V.PARA) respectively in the Deflection board.

These waveforms are applied from the Deflection board to both the non-inverted (pin 3) and inverted (pin 4) inputs of bias light shading correction circuit in IC2, where a positive or negative mixed signal C of V.sawtooth and parabola signals are made depending on the position of these controls.

VR7 (Y PED) controls the positive input potential .of bias light shading correction circuit to change the DC level of mixed signal C .

The multiplexed signal of the clamp pulse-1 (CP1), PRE BL pulse and W.BL pulse is fed from the pulse generator circuit to the pulse separator inside IC2 through pin 22, where the CP1, PRE BL pulse and W.BL pulse are separated.

The separated PRE BL pulse is fed to the bias light shading correction circuit inside IC2. The amplified pre-video signal D is then modulated by the signal C and PRE BL pulse (E & F).

The corrected pre-video signal is then fed to the clamp circuit in IC2.

4-2-2 Optical Black Clamp Circuit

Outline

The pick-up tube sends an output current corresponding to the incoming light intensity, but even when no light reaches the target, an output current called dark current is obtained.

The dark current of the pick-up tube varies with the temperature of the pick-up tube. In a TV camera using a pick-up tube, the dark level of the output signal is unstable with respect to changing temperature.

In a color camera using the single carrier frequency multiplexing system, the red(R) and blue(B) signals modulated at 4.3MHz are riding on top of the green(G) signal. Thus the black level of the R and B signals are free from temperature variations because they are independent of pick-up tube dark current. However, the black level of the Y signal which is obtained by removing the modulated R and B components from the pick-up tube output increases or decreases according to temperature variations. Therefore, the black level balance between the Y_L and R signals, and between Y_L and B signals are lost due to a temperature variations and this causes a change in color reproduction. This circuit receives the pre-video signal from the bias light shading correction circuit and clamps its dark current level for correcting the black level variation.

Details

The pre-video signal which contains the modulated red/blue signals and green signal is fed from the optical black correction circuit to the optical black clamp circuit inside IC2. A metallic strip (optical black) for cutting the incoming light at the end of the horizontal scanning period is built into the pick-up tube faceplate. When the beam scans the optical black portion G , the dark current of the pick-up tube is produced and this signal portion H is clamped to a fixed DC potential, so that the black level variation due to a change of dark current is sensed.

In other words, the dark current level H of the pre-video signal H supplied to the clamp circuit inside IC2 is clamped by the clamp pulse-1 (CP1) I separated from the multiplexed signal of CP1, pre BL and wide BL pulses inside IC2. (The multiplexed signal of CP1, pre BL and wide BL pulses are generated in the pulse generator circuit, mixed and then fed to the pulse separator where they are separated.)

Therefore, even if the dark current level drifts due to the temperature variations, the DC potential of the optical black (OB) level is held constant.

In this way, the black level variation is corrected.

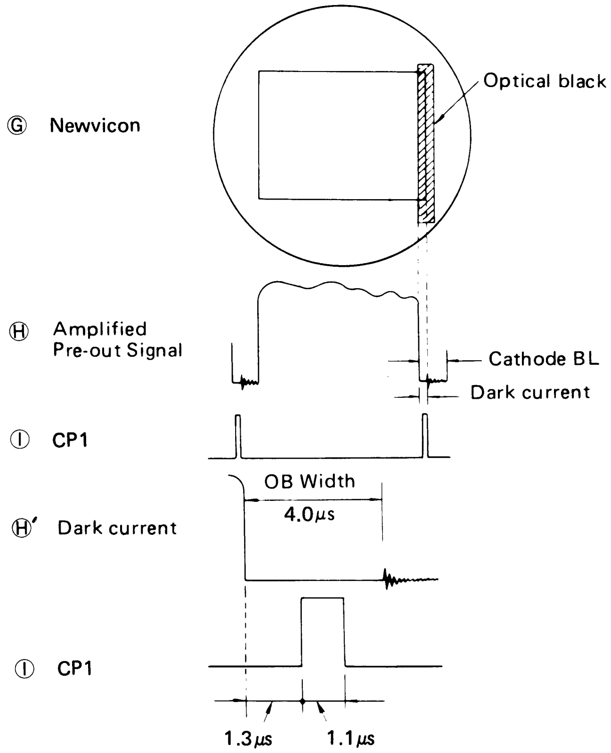


Fig. 4-2-3 OB Clamp

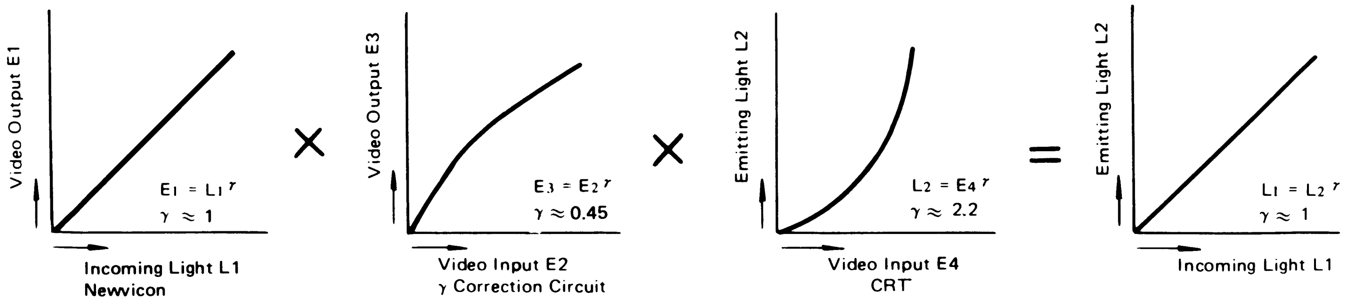


Fig. 4-2-4 Gamma Correction

4-2-3 Gamma Correction Circuit

Outline

This circuit corrects the non-linear photoelectric conversion characteristic of cathode ray tube (CRT) and reproduces a linear picture of high fidelity on the monitor.

In order for a televised picture to have the same contrast gradation as the original scene, the system (including the pick-up tube, signal processing inside camera and monitor, and CRT) gamma must be equal to 1.

The gamma characteristic of Newvicon® is approx. 1.0 and the gamma characteristic of the monitor CRT is approx. 2.2, so that the gamma characteristic of the gamma correction circuit should be approx. 0.45, which makes the total gamma to be approx. 1.0 as shown in Fig. 4-2-4.

Details

The pre-video signal is fed to the gamma(r) correction circuit and undergoes the gamma correction.

Since the modulated red(R) and blue(B) signals are ridden on the green(G) signal, the negative feedback gamma correction circuit is adapted.

4-2-4 Automatic Iris Control Detection Circuit

Outline

This circuit detects the DC voltage corresponding to the light intensity and sends this DC voltage to the automatic iris control drive circuit in the Audio/Lens Control board.

Details

The wide BL (W.BL) pulse separated from CP1/PRE BL/W.BL mixed signal is supplied to the AIC modulation circuit inside IC2 from the pulse separator.

The pre-video signal is fed from the PRE BL mix circuit to the modulation circuit, where the pre-video signal is modulated by the W.BL pulse.

The modulated pre-video signal is peak-rectified in the modulation circuit and converted into DC voltage corresponding to the pre-video level i.e., the incoming light intensity. This DC voltage is fed through pin 19 of IC2 and terminal N0. 13 of CN3 to the automatic iris control circuit in the Audio/lens control board together with the DC voltage set by VR3 (AIC SET) which sets the normal iris stop at the standard light intensity. The DC voltage is also supplied to the low light indicator circuit in IC2.

When the camera is operated in the normally illuminated scene, the output from the low light indicator at pin 21 of IC2 is low level. However, when the camera is aimed at the weakly illuminated scene, the output becomes high level and it is sent to the Micro processor board for displaying the graphics in the EVF.

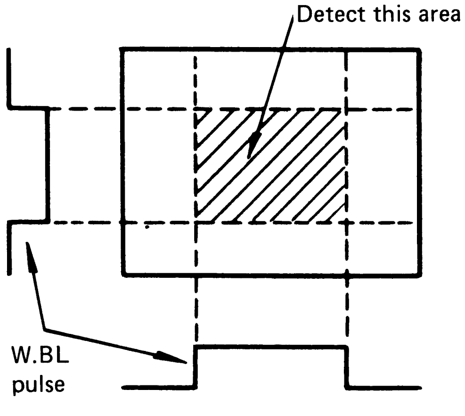


Fig. 4-2-5 Automatic Iris Control Detection

4-2-5 Automatic Gain Control Circuit

Outline

This circuit amplifies the preamplifier output signal. The amplified signal level is maintained constant by automatically gain controlled amplifier. The gain of the amplifier starts to vary only when the lens iris is fully opened.

Details

The pre-video signal from the gamma correction circuit in IC2 is fed through the AGC amplifier and amplifier to trap CF1 which removes the 4.3MHz modulated component and the luminance (Y) signal is obtained. The Y signal is then applied to the AGC detect circuit where the Y signal is modulated by the wide BL pulse from the pulse separator and the modulated Y signal is made for detecting signal level corresponding to the center image. The modulated Y signal is peakrectified in the AGC detect circuit and converted into DC voltage corresponding to the Y signal level i.e., the incoming light intensity. This DC voltage is then fed through pins 17 and 16 of IC2 to the AGC control circuit where it is compared with the reference DC voltage. The error between the DC voltages is fed through the AGC ON/OFF switch SW4 to the AGC amplifier to control its gain.
When the camera is used in the normally illuminated scene, the signal level is maintained constant by automatically iris adjusted lens. Therefore the gain of AGC amplifier does not change. However, when the camera is aimed at the weakly illuminated scene and lens iris becomes wide open, the Y signal level is decreased. The decreased Y signal level is detected by the AGC detection circuit and converted into the DC voltage. This DC voltage is fed through the AGC control circuit and the AGC ON/OFF switch SW4 to the AGC amplifier to control the gain of amplifier.
In this way the signal level corresponding to normal and relatively high illumination is kept constant by the lens iris opening, while the signal level corresponding to relatively low illumination is controlled by the AGC circuit.
The gain controlled pre-video signal which has the modulated red and blue signal at pin 13 of IC2 is supplied to the luminance signal processing circuit and red and blue separation circuit.
VR2 (AGC SET) sets the gain of the amplifier at the standard light intensity in the automatic gain control mode.
VR1 (MANUAL GAIN) sets the gain of the amplifier at the standard light intensity in the manual gain control mode.

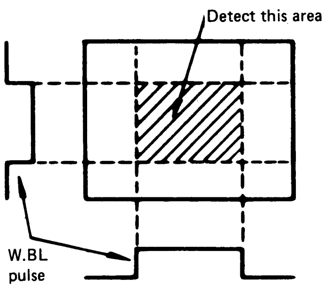


Fig. 4-2-6 Automatic Gain Control Detection

4-2-6 Y_H Signal Circuit

Outline

This circuit receives the amplified pre-video signal from the automatic gain control circuit and generates the luminance (Y_H) signal having high frequency response characteristic.

Details

The amplified pre-video signal is fed from the AGC circuit through pin 13 of IC2 to trap CF1 which removes the 4.3MHz modulated component and luminance (Y) signal is obtained. The Y signal at pin 8 of IC2 is fed to the Y_H white suppress circuit, where the high level of Y signal is slightly suppressed. The suppressed Y signal is then supplied to 3.2MHz low pass filter CF4, where the frequency response of Y signal is limited to 3.2MHz, and the Y_H signal having high frequency response characteristic is generated.
The Y_H signal is then mixed with the vertical edge signal supplied from the vertical edge signal generator circuit. After its level is set by VR14 (Y GAIN), the Y_H signal is supplied to the horizontal aperture signal circuit in IC8.

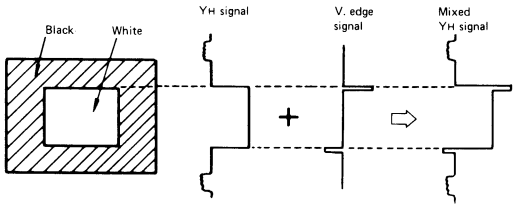


Fig. 4-2-7 Y_H Signal Processing

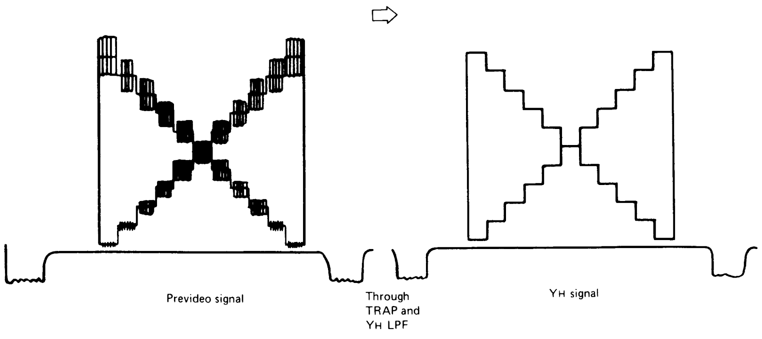


Fig. 4-2-8 Trap Effect

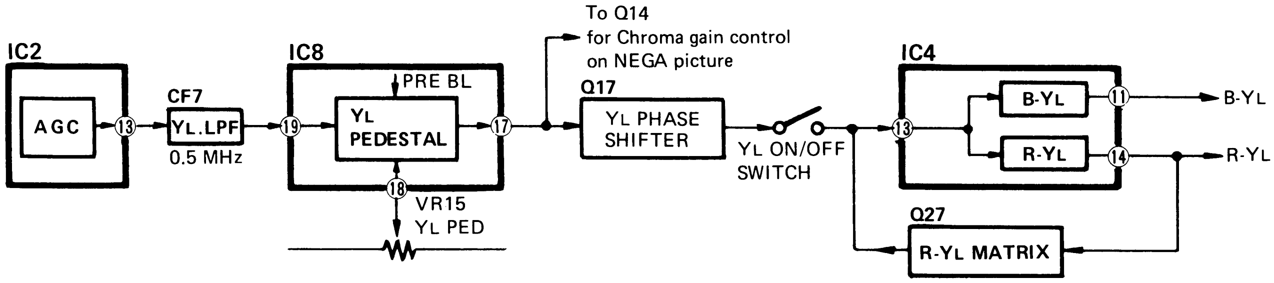

To Q14
for Chroma gain control
on NEGA picture
IC2
AGC
13
CF7
YL.LPF
0.5 MHz
IC8
PRE BL
19
YL
PEDESTAL
17
18
VR15
YL PED
Q17
YL PHASE
SHIFTER
YL ON/OFF
SWITCH
IC4
13
B-YL
11
R-YL
14
B-YL
R-YL
Q27
R-YL MATRIX

Fig. 4-2-9 Y_L Signal Circuit

4-2-7 Y_L Signal Circuit

This circuit receives the amplified pre-video signal from the automatic gain control circuit and generates the luminance (Y_L) signal having low frequency response characteristic.

Details

The amplified pre-video signal is fed from the AGC circuit through pin 13 of IC2 to 0.7MHz low pass filter CF7, where the 4.3MHz modulated component is removed and the luminance (Y_L) signal of which frequency response is limited to 0.7MHz is obtained. The Y_L signal thus made is fed to the Y_L pedestal circuit inside IC8, where Y_L signal is mixed with the pre BL pulse and the mixed signal is made. The mixed signal's low level pre BL portion is clipped and its pedestal level is set. The clip level (pedestal level) is set by VR15 (Y_L PED).

The Y_L signal whose pedestal level is set is supplied from pin 17 of IC8 to pin 13 of IC4, the R-Y_L/B-Y_L signal circuit in the red and blue separation & Chroma processing circuit through Y_L phase shifter Q17.

CT3 (Y_L PHASE) is a control for Y_L phase.

Q27 is a matrix circuit which amplifies and inverts the R-Y_L signal and mix it to Y_L signal for better color reproduction.

4-3 Horizontal Aperture Signal Generator Circuit

Outline

This circuit generates the horizontal(H) edge (aperture) signal to enhance the horizontal resolution.

Details

The luminance (Y_H) signal having high frequency response is fed from the Y_H signal circuit to the H.aperture generator circuit.

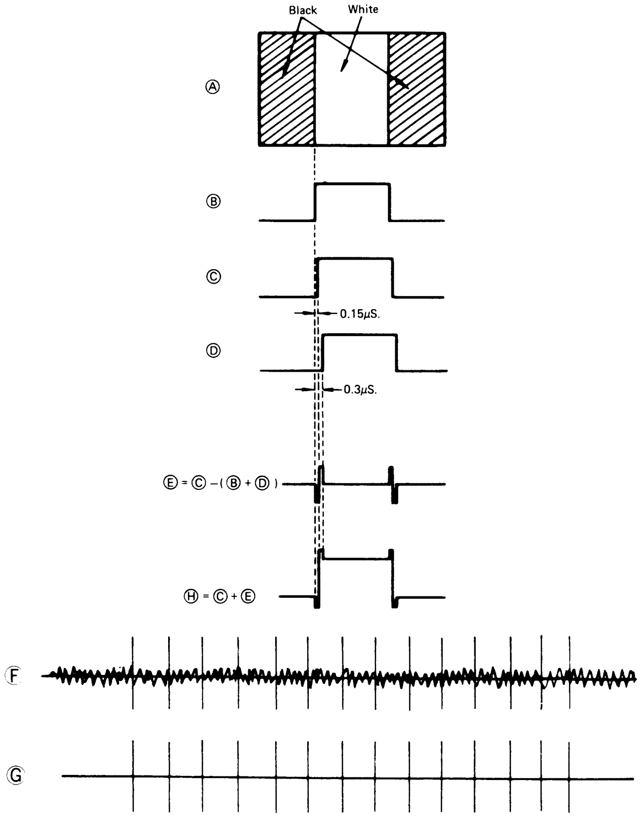

Black
White
Ⓐ
Ⓑ
Ⓒ
0.15μS.
Ⓓ
0.3μS.
Ⓔ=Ⓒ-(Ⓑ+Ⓓ)
Ⓗ=Ⓒ+Ⓔ
Ⓕ
Ⓖ

Fig. 4-3-1 Horizontal Aperture Signal

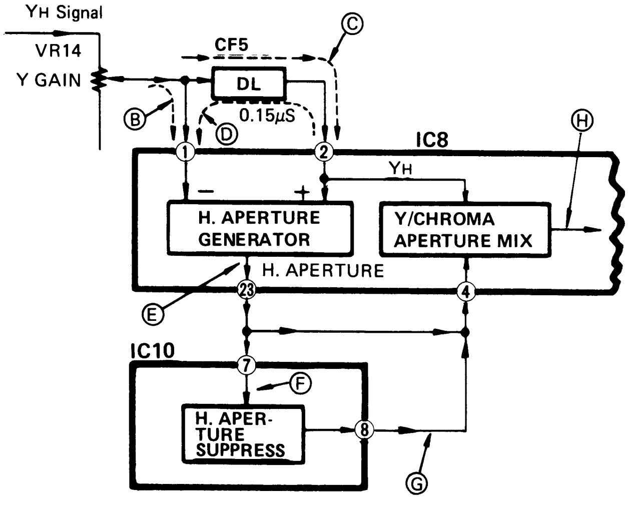

YH Signal
VR14
Y GAIN
CF5
DL
0.15μS
Ⓑ
Ⓒ
Ⓓ
Ⓗ
1
2
IC8
YH
H. APERTURE
GENERATOR
Y/CHROMA
APERTURE MIX
H. APERTURE
23
4
Ⓔ
IC10
7
Ⓕ
H. APER-
TURE
SUPPRESS
8
Ⓖ

Fig. 4-3-2 Horizontal Aperture Signal Generator Circuit

When the camera is aimed at an object A for example, the signal B passed through pin 1 of IC8, signal C delayed 0.15 μs by delay line CF5 and amplified in the H.aperture generator circuit and signal D which results from the delayed Y_H signal being reflected back through CF5 and delayed again (0.3 μs) appear at the output of the H.aperture generator circuit where they are mixed in fixed proportions to make up the H.aperture signal E. The H.aperture signal obtained in this way is applied through pin 23 of IC8 and pin 7 of IC8 to the H.aperture noise suppress/coring circuit, where the noise mixed in the H.aperture signal F is removed (G).

The H.aperture signal which undergoes the noise coring is then supplied through pin 4 of IC8 to the Y/chroma/aperture mix circuit, where it is mixed with the luminance and chrominance signal.

4-4 Vertical Edge Signal Generator Circuit

Outline

This circuit generates a vertical edge signal for increasing the vertical resolution by enhancing vertical edge contrast.

Details

The luminance (Y(edge)) signal A , for making the vertical(V) edge signal, supplied from pin 10 of IC2 is fed to the Y(edge) delay circuit IC9 (CCD:charged coupled device) through pin 5. In the Y(edge) delay circuit, the Y(edge) signal is delayed 1H line by IC9. The 1H delayed signal obtained at pin 2 of IC9 B is fed to pin 2 of IC3 through buffer Q18 and low pass filter CF8 and VR18 (V.EDGE BALANCE). Also the undelayed Y(edge) signal is fed from pin 10 of IC2 to pin 4 of IC3. The 1H delayed Y(edge) signal B is mixed with the undelayed Y(edge) signal A to form a vertical edge signal C . The vertical edge signal is fed to the V.edge amplifier in IC3. The amplified V.edge signal is fed to the detection circuit in IC3, where the positive V.edge signal D is generated. This signal is sent to the chroma gain control circuit to reduce the vertical spurious signal. The V.edge signal D is fed to the mixing circuit in IC3, where it is mixed with the amplified V.edge and V.edge signal E is made. The V.edge signal E is sent to the vertical transient spurious correction circuit inside IC3 through pin 9, and to the Y_H signal circuit where it is mixed with the Y_H signal to make sharp picture.

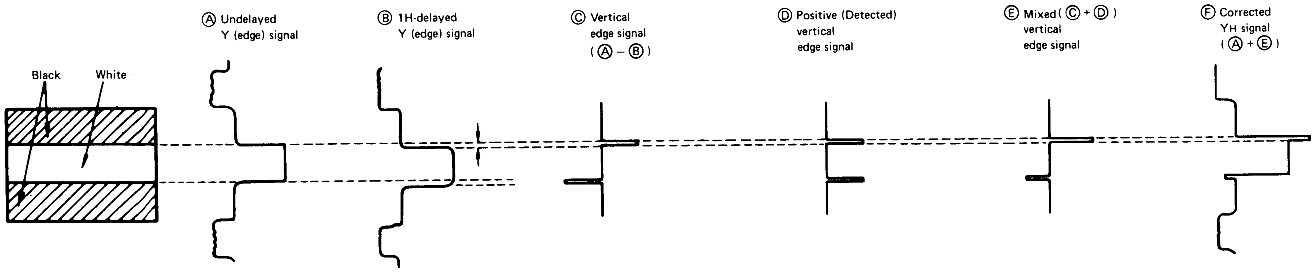

Ⓐ Undelayed Y (edge) signal
Ⓑ 1H-delayed Y (edge) signal
Ⓒ Vertical edge signal (Ⓐ-Ⓑ)
Ⓓ Positive (Detected) vertical edge signal
Ⓔ Mixed(Ⓒ+Ⓓ) vertical edge signal
Ⓕ Corrected YH signal (Ⓐ+Ⓔ)
Black
White

Fig. 4-4-1 Vertical Edge Signal

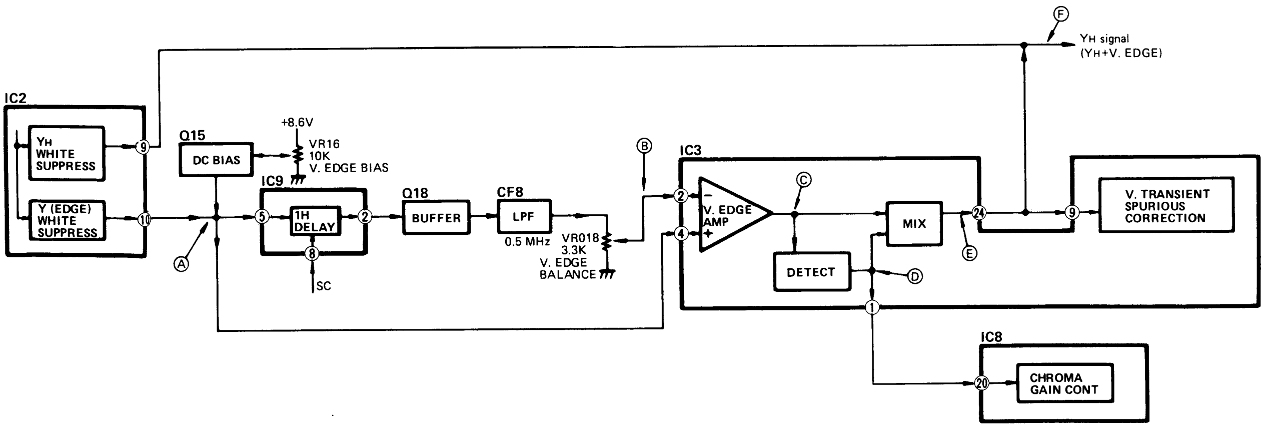

Ⓕ
YH signal (YH+V. EDGE)
IC2
YH WHITE SUPPRESS
Y (EDGE) WHITE SUPPRESS
9
10
Ⓐ
Q15
DC BIAS
+8.6V
VR16 10K V. EDGE BIAS
IC9
1H DELAY
5
2
8
SC
Q18
BUFFER
CF8
LPF
0.5 MHz
VR018 3.3K V. EDGE BALANCE
Ⓑ
IC3
2
4
V. EDGE AMP
Ⓒ
DETECT
Ⓓ
MIX
Ⓔ
24
1
9
V. TRANSIENT SPURIOUS CORRECTION
IC8
20
CHROMA GAIN CONT

Fig. 4-4-2 Vertical Edge Signal Generator Circuit

4-5 Red and Blue Separation & Chroma Processing Circuit

This circuit consists of the red and blue separation circuit, the vertical transient spurious correction circuit, the shading correction, the tracking correction circuit, the $R-Y_L$ signal circuit, the $B-Y_L$ signal circuit and the chroma clip signal circuit.

4-5-1 Red and Blue Separation Circuit

Outline

This circuit takes out the modulated red(Rc) and blue (Bc) signals from the combined preamplifier output signal which is composed of a green(G) signal mixed with 4.3MHz modulated red(Rc) and blue(Bc) signal.

Details

The amplified pre-video signal A obtained at pin 13 of IC2 is fed to 4.3MHz band pass filter (BPF) CF2 where the Rc/Bc signal B is detected.The detected Rc/Bc signal is then supplied through VR4 (R/B GAIN) to the 90° phase shifter through pre BL mix circuit where the noise on the blanking period is removed. The 90° phase-shifted Rc/Bc signal C obtained at pin 11 of IC3 is applied to the R/B separation circuit inside IC4 through pin 2. CT2 (R/B SEPARATION-1) is a control for shifting the phase of Rc/Bc signal by 90 .

The Rc/Bc signal B at pin 6 of IC3 is supplied to 1H delay line DL1 where it is delayed one horizontal line (63.5 μsec). 1H delayed Rc/Bc signal is then sent to the vertical transient spurious correction circuit inside IC3 through VR5 (R/B SEPARATION-2) and pin 18. (The vertical transient spurious correction circuit will be described later.)

The Rc/Bc signal D undergoes the vertical transient spurious correction and inverted in the correction circuit is applied to the R/B separation circuit inside IC5 through pin 24.

In the R/B separation circuit, the 90° phase-shifted Rc/Bc signal C and the inverted 1H-delayed Rc/Bc signal D are added forming the Rc signal E , and the Rc/Bc signal C and the Rc/Bc signal D are subtracted each other forming the Bc signal F .

The Rc and Bc signals thus separated are fed to the respective shading/tracking correction circuits.

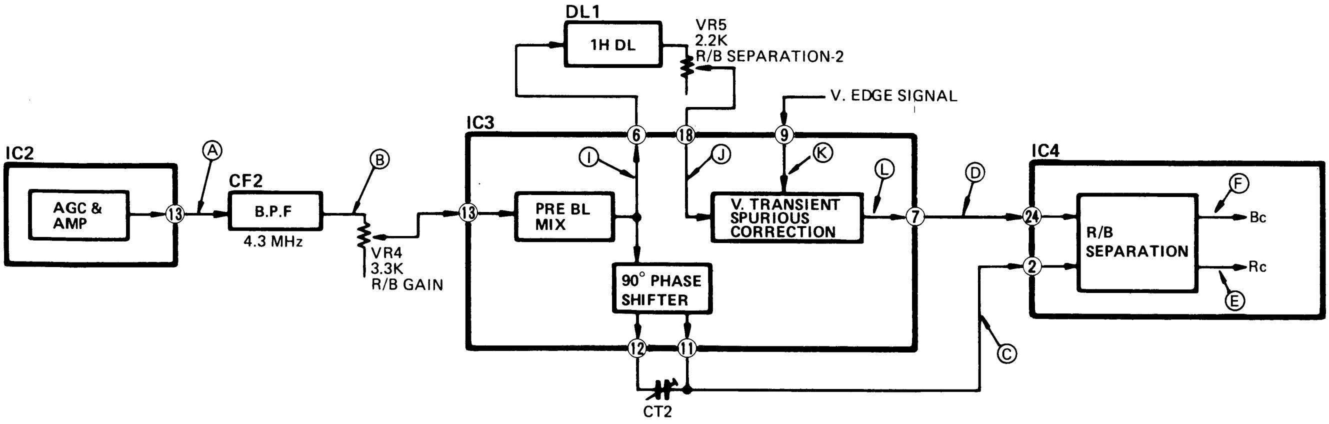


Fig. 4-5-1 Red and Blue Separation Circuit

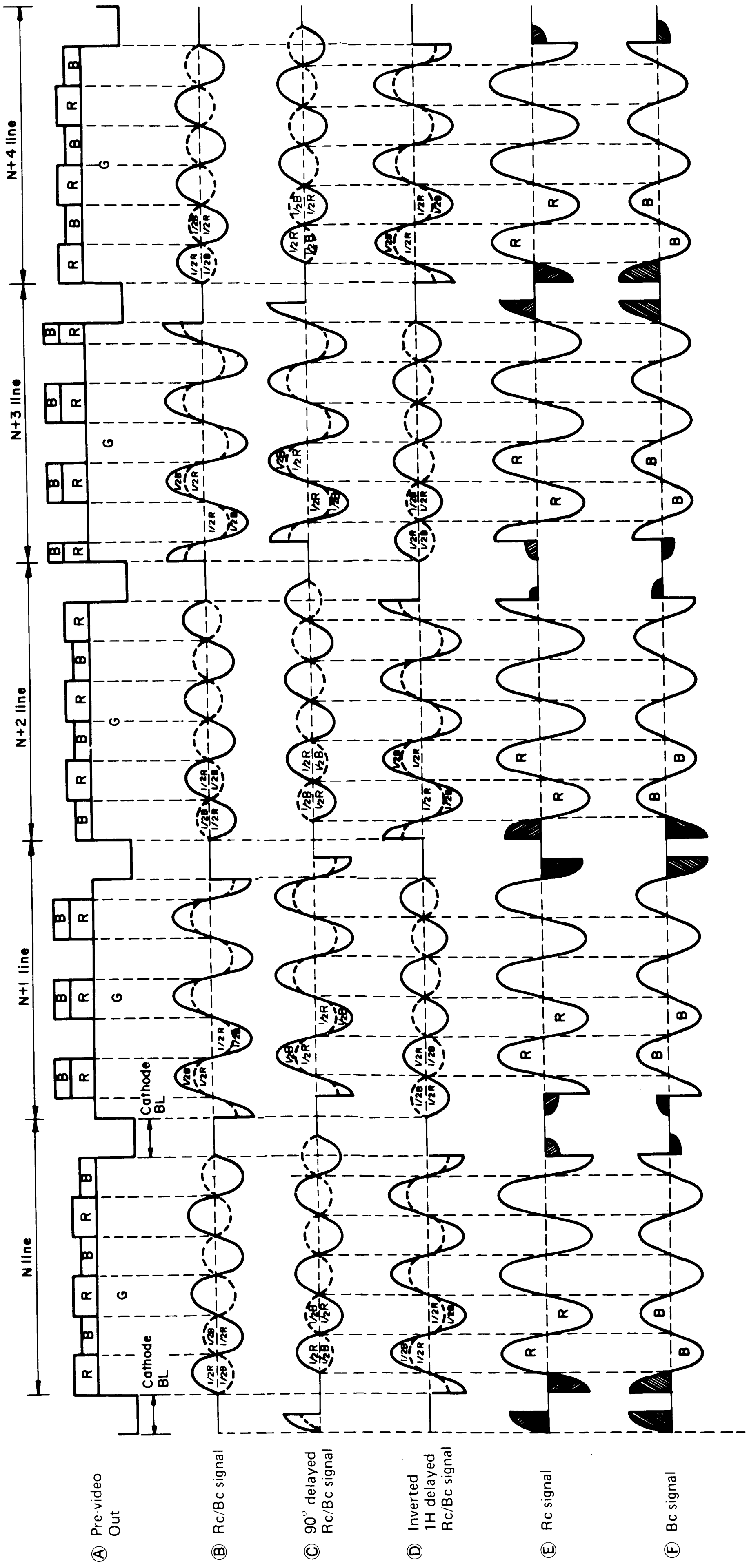

Ⓐ Pre-video Out
Ⓑ Rc/Bc signal
Ⓒ 90° delayed Rc/Bc signal
Ⓓ Inverted 1H delayed Rc/Bc signal
Ⓔ Rc signal
Ⓕ Bc signal
N line
N+I line
N+2 line
N+3 line
N+4 line
Cathode BL
R
B
G
1/2R
1/2B

Fig. 4-5-2 Red and Blue Signal Separation

4-5-2 Vertical Transient Spurious Correction Circuit

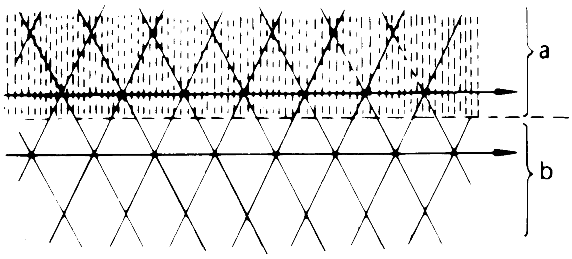
Outline

As described previously in red and blue separation circuit, the Rc and Bc signals are separated from each other by addition or subtraction of the Rc/Bc signal delayed one line(1H) and the 90° phase-shifted Rc/Bc signals but not delayed.

When a pattern such as shown below is seen by the camera, the Rc/Bc signal which is not delayed appears as in I , and the Rc/Bc signal delayed one line(1H) becomes as in J .

Therefore, it is impossible to secure vertical correlation between Rc/Bc signals of N+1 line, and a spurious signal differing in level of Rc and Bc signals against Y signal H is generated, and the vertical(V) edge of the object is unnaturally colored by this spurious signal.

The vertical transient spurious correction circuit controls the amplitude of 1H-delayed Rc/Bc signal J corresponding to the N+1 line with vertical(V) edge signal K and the signal L is made. This provides vertical correlation between Rc/Bc signals I and L prior to color separation.



a : Dark object
b : Bright object

Fig. 4-5-3

Details

The vertical edge signal K is sent from the vertical edge signal generator circuit to the vertical transient spurious correction circuit inside IC3 through pin 9 of IC3. In this circuit, those parts of the 1H-delayed Rc/Bc signal J which do not correlate with the Rc/Bc signal I (not 1H-delayed) are controlled in level by the vertical edge signal K. The corrected Rc/Bc signal L is fed to the R/B separation circuit inside IC4 through pin 2 of IC4 and pin 24 of IC4.

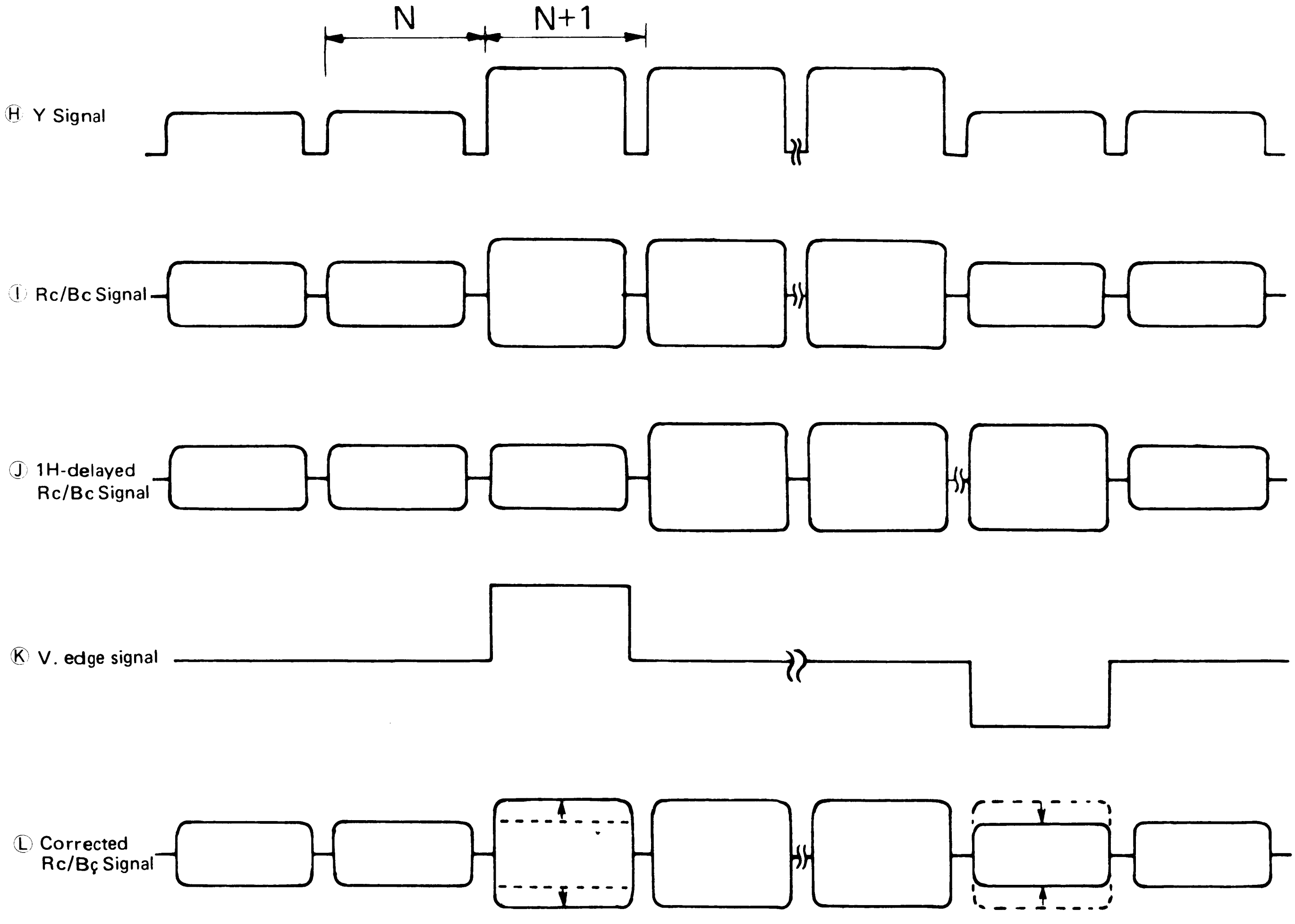


Fig. 4-5-4 Vertical Transient Spurious Correction

4-5-3 Shading Correction Circuit

Outline

Even when dynamic focus is applied to grid-4(G4) of pick-up tube, the non-uniformity of modulation due to uneven focus on the target can not be completely eliminated.
Modulation non-uniformity also occurs due to non-uniform structure in the photoconductive layer of the pick-up tube (manufacture tolerance).
The shading correction circuit compensates for residual picture shading using horizontal(H) and vertical(V) sawtooth and parabola signals written in the FAMOS (EP-ROM) IC.

Details

. Red shading correction

The horizontal shading correction signal obtained at pin 18 of FAMOS IC IC6 and the vertical shading correction signal obtained at pin 6 of IC6 are mixed and supplied to the red shading/tracking correction circuit inside IC4 through pin 22.
Suppose a uniformly illuminated white object is seen by the camera and the Rc signal has a shading (unevenness of amplitude) M . This is sent to the shading/tracking correction circuit from the Rc/Bc separation circuit inside IC4. In this case, the shading correction signal N is written in IC6 in the factory and it is applied to the correction circuit.

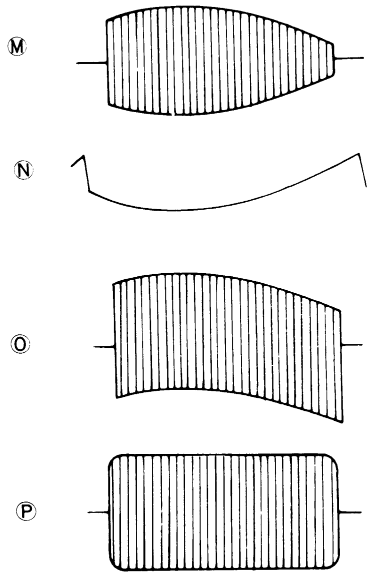


Fig. 4-5-5 Shading Correction

In this case, the four red shading controls are adjusted to generate the shading correction signal N . The Rc signal M is modulated by the shading correction signal N and the corrected signal O is produced. The shading of the Rc signal O is removed in the correction circuit and the Rc signal P is obtained. In this way, the shading of the Rc signal is corrected.
The corrected Rc signal is then fed to the R-Y_L signal circuit inside IC4.

. Blue shading correction

As in the case of red shading correction, the horizontal shading correction signal obtained at pin 17 of IC6 and the vertical shading correction signal obtained at pin 5 of IC6 are mixed and fed to the shading/tracking correction circuit inside IC4 through pin 3, where it modulates the modulated blue(Bc) signal (supplied from the R/B separation circuit) for the shading correction. The shading-corrected Bc signal is then applied to the B-Y_L signal circuit inside IC4.

4-5-4 Correction Signal Generator Circuit

Outline

This circuit generates the bias light shading correction signal, the dynamic focus correction signal and the shading correction signal corresponding to the characteristics of the pick-up tube. These signals are supplied to the respective correction circuit.

. Bias light shading correction signal

The light intensity by the bias light LEDs is not uniform along the entire target surface. Therefore, the bias current which is produced by the pick-up is not uniform, but has a shading A .
As described in the section on the principles of single carrier frequency multiplexing, the red and blue signals are obtained by detecting the modulated signals from the preamplifier output using a band pass filter. Therefore, the red and blue signals are free from bias light shading.
However, the luminance signal is obtained by removing the modulated signal using a trap circuit. Therefore, the luminance signal receives undesirable bias light shading. The bias light shading correction which contains the horizontal sawtooth and parabola signals B to the signal processing circuit to mix it to the preamplifier output signal for correcting color shading at low illumination levels (C).

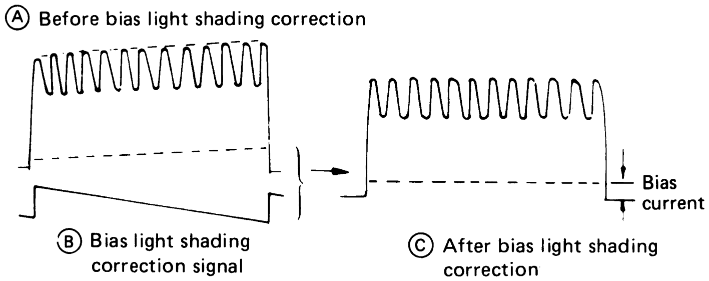

Ⓐ Before bias light shading correction
Bias current
Ⓑ Bias light shading correction signal
Ⓒ After bias light shading correction

Fig. 4-5-6 Bias Light Shading Correction

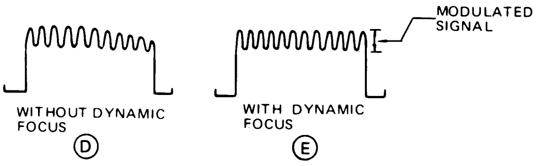

MODULATED SIGNAL
WITHOUT DYNAMIC FOCUS
Ⓓ
WITH DYNAMIC FOCUS
Ⓔ

Fig. 4-5-7 Dynamic Focus Correction

. Dynamic focus correction signal

Generally, the focus voltage which brings the beam in focus in the center part of the pick-up tube is different in level from the voltage which brings the edge portions of the pick-up tube into best focus so that the modulation depth for the center part and the edge portions of the pick-up tube differ. When the camera is directed at an evenly illuminated white object, the red and blue signals modulated at 4.3MHz do not have a uniform level, and as a result, a color shading appears (D). The dynamic focus correction signal which contains the horizontal and vertical sawtooth and parabola signals is supplied to the pick-up tube's focus electrode (grid-4) together with the DC focus voltage to focus the electron beam along the entire scanning area for correcting unevenness of modulation depth (E).

. Shading correction signal

Even when dynamic focus correction is applied to grid-4 of pick-up tube, the non-uniformity of modulation due to uneven focus on the target can not be completely eliminated.

Modulation un-uniformity also occurs due to non-uniform structure in the photoconductive layer of the pick-up tube (manufacture tolerance).

The shading correction signal which contains the horizontal and vertical sawtooth and parabola signals is fed to the shading correction circuit to compensate for residual picture shading (Refer to Shading Correction Circuit).

Details

The horizontal and vertical shading correction signals of horizontal sawtooth/parabola and vertical sawtooth/parabola signals from pins 18 and 6 of IC6 is fed to pin 22 of IC4 for correcting the red shading. Similarly the horizontal and vertical shading correction signals are supplied from pins 17 and 5 of IC6 to pin 3 of IC4 for correcting the blue shading.

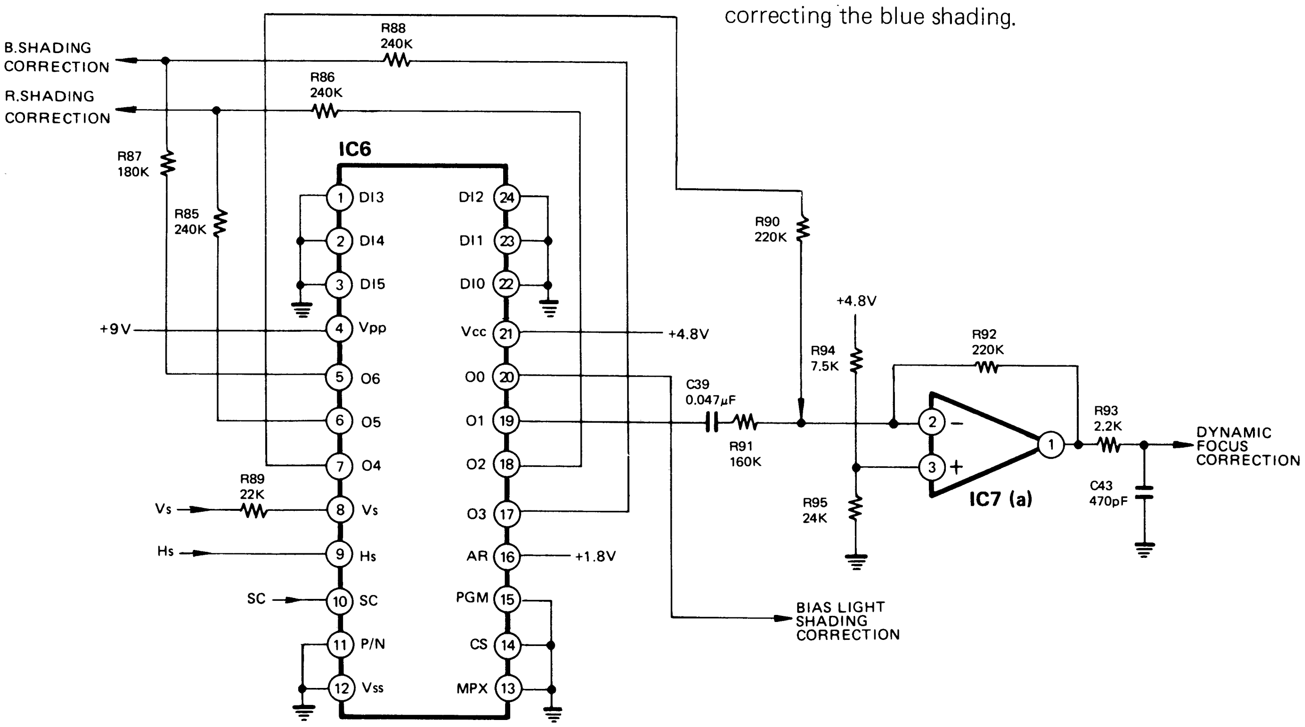

B.SHADING CORRECTION
R.SHADING CORRECTION
R88 240K
R86 240K
R87 180K
R85 240K
IC6
1 DI3
2 DI4
3 DI5
4 Vpp
5 O6
6 O5
7 O4
8 Vs
9 Hs
10 SC
11 P/N
12 Vss
DI2 24
DI1 23
DI0 22
Vcc 21
O0 20
O1 19
O2 18
O3 17
AR 16
PGM 15
CS 14
MPX 13
+9V
R89 22K
Vs
Hs
SC
+4.8V
+1.8V
R90 220K
+4.8V
R94 7.5K
C39 0.047μF
R91 160K
R95 24K
R92 220K
R93 2.2K
2 −
3 +
1
IC7 (a)
C43 470pF
DYNAMIC FOCUS CORRECTION
BIAS LIGHT SHADING CORRECTION

Fig. 4-5-8 Correction Signal Generator Circuit

4-5-5 Tracking Correction Circuit

Outline

In this color camera, the red(R) and blue(B) signals modulated at 4.3MHz (high frequency component) are riding on top of the green(G) signal (low frequency component) when they are extracted from the pick-up tube.

The photoelectric conversion characteristic of the pick-up tube is different between the high frequency component and low frequency component.

The modulation depth of Rc and Bc signals corresponding to the weakly illuminated scene is reduced due to the over-beam in the pick-up tube.

As a result, the R and B signals obtained by detecting the Rc and Bc signals do not track with the Y_L signal. This circuit generates the tracking signals for correcting the characteristic of the R and B signals, and tracks them with the Y_L signal.

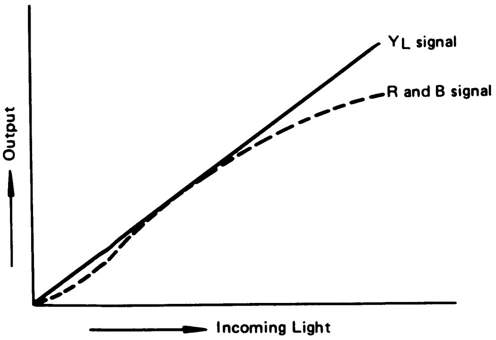


Fig. 4-5-9 Mistracking of YL and R/B Signal

Details

The amplified pre-video signal Q (which contains the modulated red and blue signals as well as the green signal) obtained at pin 24 of IC2 is fed to the low pass filter consisting of L1 and C13, where the 4.3MHz modulated component is removed and a luminance (Y) signal R is made.

The Y signal R is fed through pin 19 to the tracking signal generator inside IC3 where a tracking-1 signal S, a tracking-2 signal T and a tracking-3 signal U are generated respectively.

The tracking-1 signal S at pin 16 of IC3 is supplied to VR7 (B. TRACKING-1) and VR10 (R. TRACKING-1) for correcting the relatively low level of R and B signals.

The tracking-2 signal T at pin 17 of IC3 is fed to VR6 (B. TRACKING-2) and VR11 (R. TRACKING-2) for correcting the relatively higher portion of R and B signals.

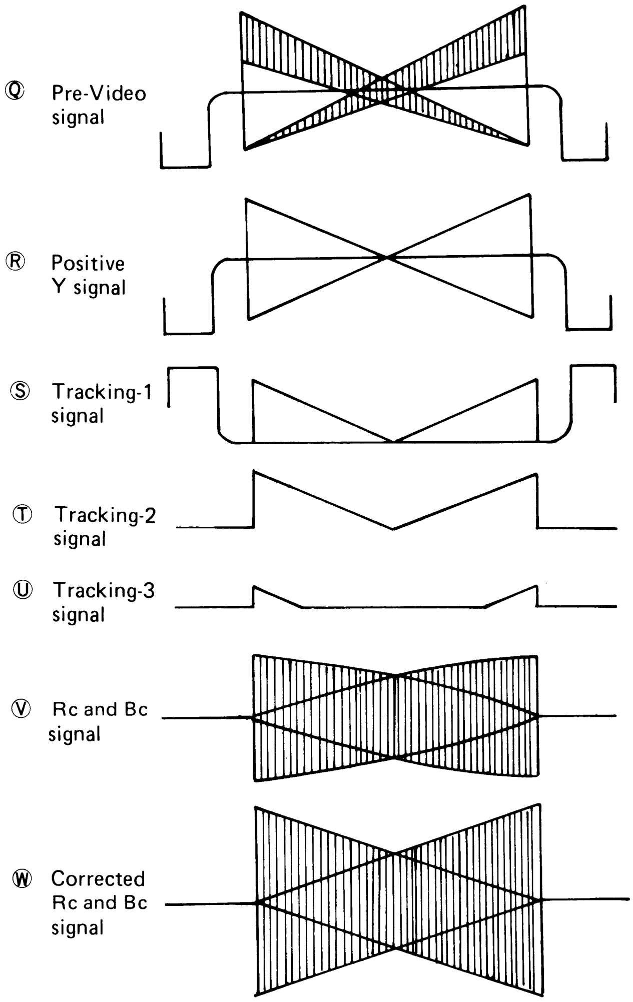


Fig. 4-5-10 Tracking Correction-1

The tracking-3 signal U at pin 15 of IC3 is sent to VR8 (B. TRACKING-3) and VR9 (R. TRACKING-3) for correcting the high level of R and B signals.

These tracking correction signals are supplied through the tracking controls to the R. shading/tracking correction circuit and B. shading/tracking correction circuit inside IC4, where they modulate the Rc and Bc signals V come from the R/B separation circuit for correcting the linearity of Rc and Bc signal W. In this way, the R and B signals match the Y_L signal.

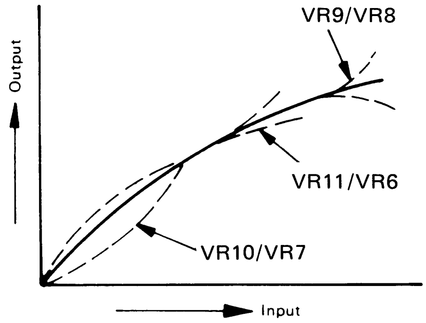


Fig. 4-5-11 Tracking Correction-2

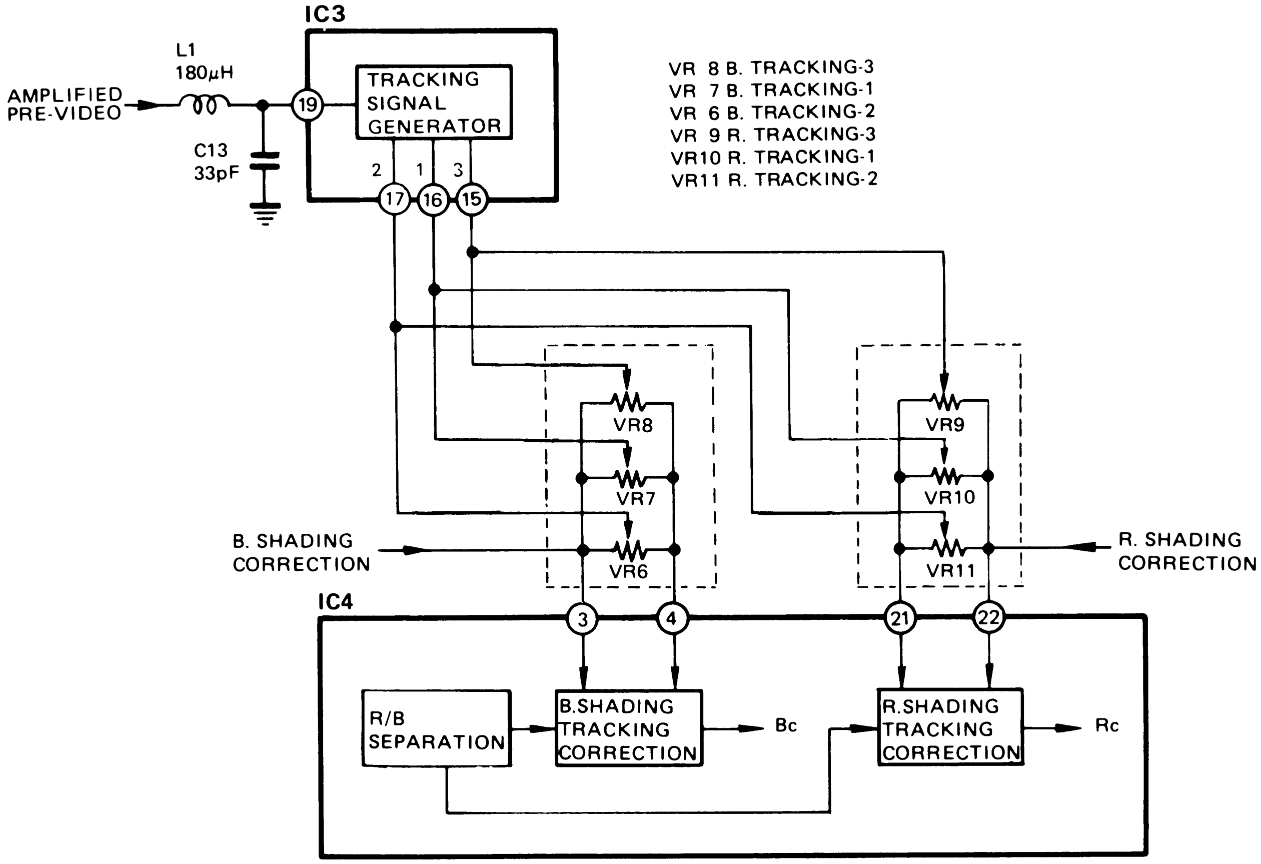

IC3
L1
180μH
AMPLIFIED
PRE-VIDEO
19
TRACKING
SIGNAL
GENERATOR
C13
33pF
2
1
3
17
16
15
VR 8 B. TRACKING-3
VR 7 B. TRACKING-1
VR 6 B. TRACKING-2
VR 9 R. TRACKING-3
VR10 R. TRACKING-1
VR11 R. TRACKING-2
VR8
VR7
VR6
VR9
VR10
VR11
B. SHADING
CORRECTION
R. SHADING
CORRECTION
IC4
3
4
21
22
R/B
SEPARATION
B.SHADING
TRACKING
CORRECTION
Bc
R.SHADING
TRACKING
CORRECTION
Rc

Fig. 4-5-12 Tracking Correction Circuit

4-5-6 R-Y_L Signal Circuit

Outline

This circuit receives the modulated red(Rc) signal from the red shading/tracking correction circuit and detects the red signal. The detected red signal and the Y_L signal supplied from the Y_L signal circuit make the R-Y_L color difference signal. The R-Y_L signal is fed to the chroma encoding circuit.

Details

The Rc signal A from the red shading/tracking correction circuit is fed to the gain control circuit whose gain is controlled for the automatic white balancing. The gain controlled Rc signal is sent to the amplifier through the PRE BL mixing circuit where the noise during the blanking period of Rc signal is removed. The positive Rc signal B and negative Rc signal C are obtained at the output of amplifier and they are forwarded to the detector. The R signal is sent to the low pass filter. The detector which extracts the red signal produces a unwanted 8.6MHz ripple signal D . The 8.6MHz component is removed by the low pass filter leaving only the red signal E.

The frequency response of red signal and Y_L signal also become same by the low pass filter.

The detected Rc signal D is then fed to the R-Y_L amplifier. The Y_L signal from the Y_L signal circuit is also supplied to the R-Y_L amplifier where the R-Y_L color difference signal is made up.

The resultant R-Y_L signal is fed through pin 14 of IC4 to the chroma encoding circuit.

The R-Y_L signal at pin 14 of IC4 is fed through R-Y_L matrix Q13 to the Y_H signal circuit and mixed with Y_H signal to compensate for better color reproduction.

VR2 (BALANCE) which is located on the side of camera is a control for fine adjustment of the color balance. VR12 (R. GAIN) is a presetting control for the red signal level. VR13 (R. PED) is a control for setting the red pedestal.

SW1 is the Y_L ON/OFF switch for disconnecting the Y_L signal.

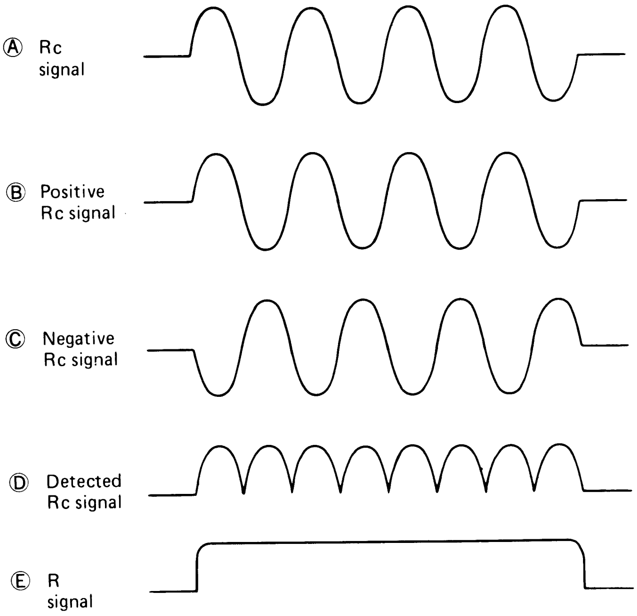

Ⓐ Rc signal
Ⓑ Positive Rc signal
Ⓒ Negative Rc signal
Ⓓ Detected Rc signal
Ⓔ R signal

Fig. 4-5-13 Red Signal Detection

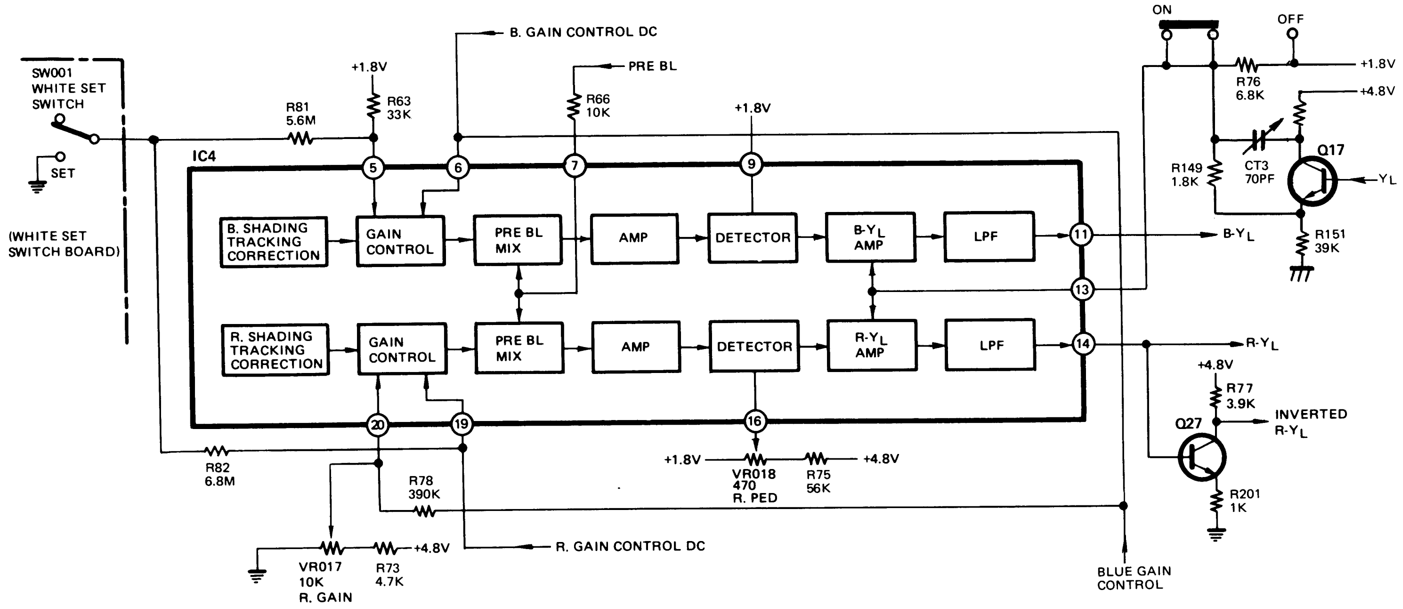

SW001
WHITE SET
SWITCH
SET
(WHITE SET
SWITCH BOARD)
R81
5.6M
+1.8V
R63
33K
B. GAIN CONTROL DC
PRE BL
R66
10K
+1.8V
IC4
5
6
7
9
B. SHADING TRACKING CORRECTION
GAIN CONTROL
PRE BL MIX
AMP
DETECTOR
B-YL AMP
LPF
11
B-YL
13
R. SHADING TRACKING CORRECTION
GAIN CONTROL
PRE BL MIX
AMP
DETECTOR
R-YL AMP
LPF
14
R-YL
20
19
16
R82
6.8M
R78
390K
VR017
10K
R. GAIN
R73
4.7K
+4.8V
R. GAIN CONTROL DC
+1.8V
VR018
470
R. PED
R75
56K
+4.8V
BLUE GAIN
CONTROL
ON
OFF
R76
6.8K
+1.8V
+4.8V
R149
1.8K
CT3
70PF
Q17
YL
R151
39K
+4.8V
R77
3.9K
Q27
INVERTED
R-YL
R201
1K

Fig. 4-5-14 R-YL/B-YL Signal Circuit

4-5-7 $B-Y_L$ Signal Circuit

Outline

This circuit uses the same design as the $R-Y_L$ signal circuit. The circuit receives the modulated blue(Bc) signal from the blue shading/tracking correction circuit and converts it to the blue signal. The $B-Y_L$ signal is made by the detected red signal and Y_L signal supplied from the Y_L signal circuit, and fed to the chroma encoding circuit.

Details

The Bc signal from the blue shading/tracking correction circuit in IC4 is sent to $B-Y_L$ amplifier after it undergoes the gain control, the preblanking mixing, the amplification and detection. The $B-Y_L$ signal made by the detected B signal through the low pass filter which removes the 8.6MHz ripple signal and the Y_L signal is fed to the chroma encoding circuit.

4-5-8 Chroma Clip Signal Circuit

Outline

When the over input signal level is fed to the amplifier or the beam of pick-up tube is insufficient to discharge the target due to excessive light reflected from a brightly illuminated object, the modulated red/blue signal components riding on to top of the green signal become saturated (G and H).

Therefore, the bright picture parts turn into an unnatural green color due to lack of red and blue.

This circuit receives the luminance(Y) signal and makes the chroma clip signal for clipping the unnatural green color. The chroma clip signal is sent to the chroma encoding circuit.

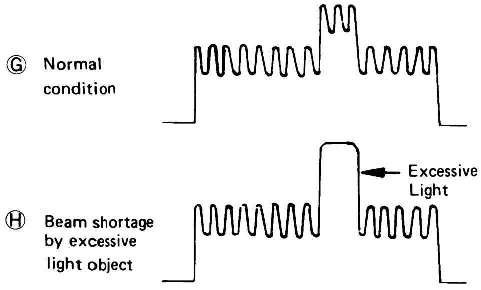

Ⓖ Normal condition
Excessive Light
Ⓗ Beam shortage by excessive light object

Fig. 4-5-15 Beam Shortage

Details

The pre-video signal at pin 24 of IC2 is fed to low pass filter which consists of L1 and C13 and the luminance (Y) signal I is made. The Y signal I is fed through pin 19 of IC3 to the white clip circuit where the high Y signal level J is detected. The detected high Y signal J , signal K delayed 0.5 μs by delay line CF3 and signal L which results from the delayed signal K being reflected back through CF3 and delayed again (1 μs) appear at the input of NAM (non-additive mixing) circuit.

The mixing signal M (J + L) is non-additively mixed with the signal K and a chroma clip signal N is made. The chroma clip signal N is fed from the NAM circuit to the chroma encoding circuit through the pulse separator/buffer and pin 23 of IC3, and to the VIDEO signal processing circuit through R51 together with the positive vertical edge signal comes through R47 (Refer to Vertical Edge Signal Generator Circuit.) to minimize unnatural green color around the bright object.

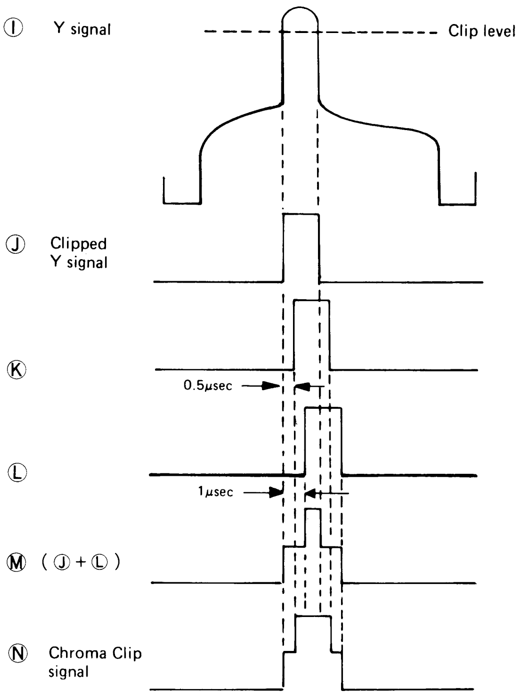

Ⓘ Y signal
Clip level
Ⓙ Clipped Y signal
Ⓚ
0.5μsec
Ⓛ
1μsec
Ⓜ (Ⓙ+Ⓛ)
Ⓝ Chroma Clip signal

Fig. 4-5-16 Chroma Clip Signal

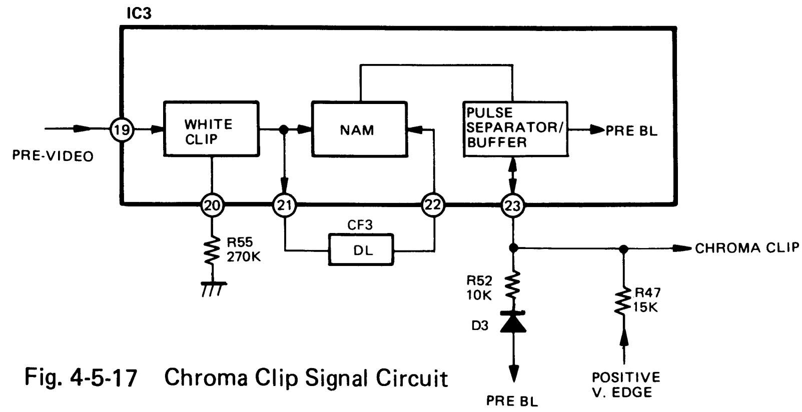

IC3
PRE-VIDEO
19
WHITE CLIP
NAM
PULSE SEPARATOR/ BUFFER
PRE BL
20
21
22
23
CF3
DL
R55 270K
R52 10K
D3
PRE BL
CHROMA CLIP
R47 15K
POSITIVE V. EDGE

Fig. 4-5-17 Chroma Clip Signal Circuit

4-6 Chrominance Encoding Circuit

This circuit contains the +2.5V power circuit, the chrominance signal generator circuit, the chroma clip/suppression circuit and the white set detection circuit.

4-6-1 +2.5V Power Circuit

Outline

This circuit generates the regulated +2.5V DC which is used as power supply for IC10.

Details

+1.8V DC generated inside IC3 is fed through pin 5 and L10 to the emitter of Q21 which is used as a diode. The +2.5V DC obtained at the collector of Q21 is supplied to pin 6 of IC10 as a power supply.

4-6-2 Chrominance Signal Generator Circuit

Outline

This circuit receives the R-Y_L and B-Y_L color difference signals and modulates these base band color difference signal on two subcarrier differing in phase by 90° to generate a chrominance signal. The burst signal is also generated in this circuit.

Details

The R-Y_L color difference signal is fed from the R-Y_L signal circuit in IC4 to the R-Y_L clamp circuit in IC10 through pin 3, where the blanking period of R-Y_L signal is clamped by the clamp pulse-2(CP2) from the pulse separator in IC10. The clamped R-Y_L signal is then supplied to the R-Y_L balance modulator where it is mixed with the burst flag pulse (BFP) applied from the pulse generator circuit through pin 2 of IC10 and clamp circuit. The R-Y_L signal with the burst flag pulse (BFP) modulates the (R-Y) subcarrier applied to the modulator from the pulse generator circuit through pin 14 of IC10. The modulator produces an amplitude modulated (suppressed carrier) signal.

Similarly, the B-Y_L color difference signal is fed from the B-Y_L signal circuit to the B-Y_L balance modulator circuit in IC10 through pin 4 of IC10 and the B-Y_L clamp circuit, where the B-Y_L signal is mixed with the burst flag pulse (BFP) supplied through pin 2 of IC10 and BFP clamp circuit. The B-Y_L signal with the burst flag pulse (BFP) and the (B-Y) subcarrier applied to the modulator through pin 16 of IC10 undergo suppressed carrier amplitude modulation. The R-Y_L modulated signal and the B-Y_L modulated signal is added forming the chrominance signal with the burst. The chrominance signal is then forwarded to the chroma clip/suppress circuit.

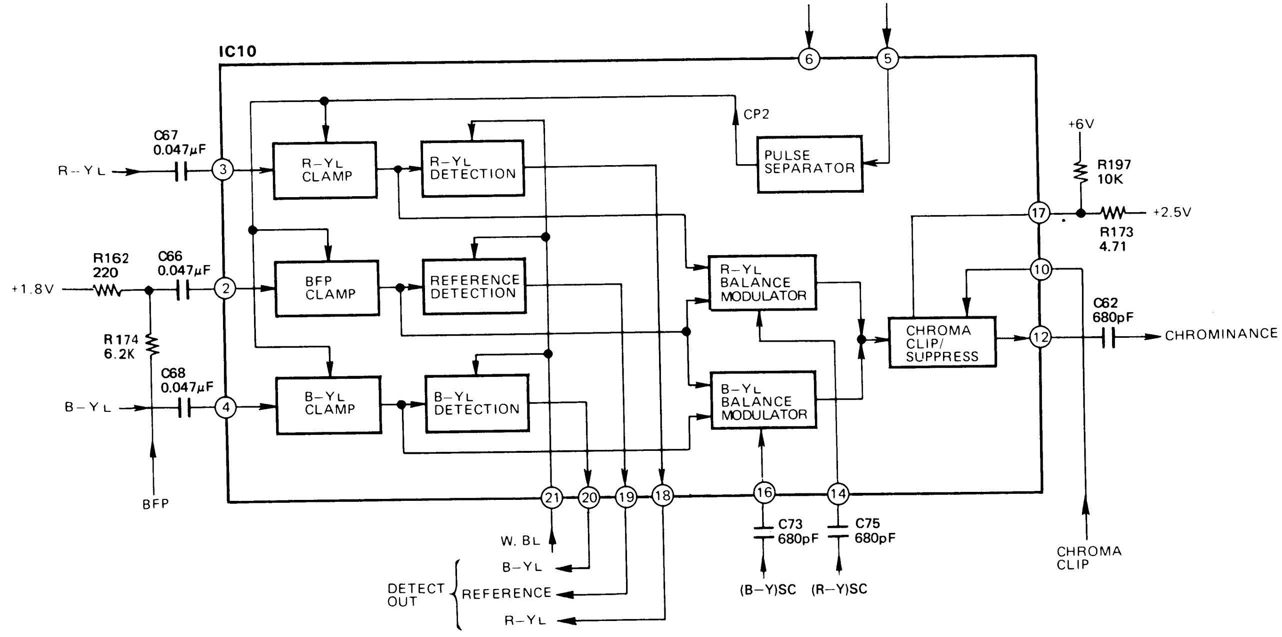

+2.5V
CP2
IC10
6
5
CP2
PULSE SEPARATOR
+6V
R197 10K
C67 0.047μF
R-YL
3
R-YL CLAMP
R-YL DETECTION
17
+2.5V
R173 4.71
R162 220
C66 0.047μF
+1.8V
2
BFP CLAMP
REFERENCE DETECTION
R-YL BALANCE MODULATOR
10
C62 680pF
R174 6.2K
CHROMA CLIP/ SUPPRESS
12
CHROMINANCE
C68 0.047μF
B-YL
4
B-YL CLAMP
B-YL DETECTION
B-YL BALANCE MODULATOR
BFP
21
20
19
18
16
14
C73 680pF
C75 680pF
W. BL
B-YL
DETECT OUT
REFERENCE
R-YL
(B-Y)SC
(R-Y)SC
CHROMA CLIP

Fig. 4-6-1 Chroma Encoding Circuit

4-6-3 Chroma Clip/Suppress Circuit

Outline

This circuit contains the high Y level chroma clip circuit and low level chroma suppress circuit.
The high Y level chroma clip circuit clips the green color which results when an excessively bright object is shot with the camera. (Refer to Chroma Clip Signal Circuit for details.)
The low level chroma suppression circuit enhances color reproduction in low luminance condition by improving the white balance, when the color of the object is faint.

Details

The chrominance signal with the burst A is supplied to the chroma clip/suppress circuit from the R-Y_L and B-Y_L balance modulator circuits. The chroma clip signal B which is made in the chroma clip signal circuit in IC3 is supplied through pin 10 of IC10 to the chroma clip/suppress circuit where the chrominance signal corresponding to the excessive bright object is clipped C and does not reach the video output.
The chroma clip signal also suppresses the chrominance signal around the unnatural green color.

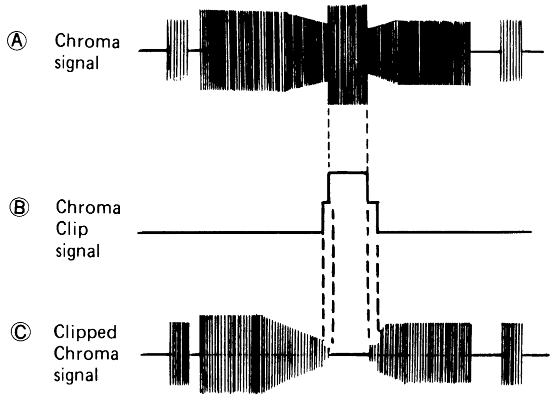


Fig. 4-6-2 Chroma Clip

The DC voltage obtained by dividing the voltage between +6V and +2.5V with R164 and R165, and fed to the chroma clip/suppress circuit through pin 9 of IC10 determines the low suppression level of chroma signal. This DC voltage is applied to the chroma clip/suppress circuit and clips the low chrominance level.

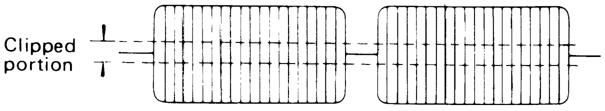


Fig. 4-6-3 Chroma Suppress

4-6-4 White Set Detection Circuit

Outline

This circuit receives the R-Y_L, B-Y_L and reference DC voltage from the respective clamp circuits and converts them to the DC voltages. The detected DC voltages are sent to the white balance setting circuit.

Details

The clamped R-Y_L, the clamped B-Y_L and the clamped burst flag pulse (BFP) are respectively fed to the detection circuits and their center portions are gated by the wide blanking (W.BL) pulse supplied through pin 21 of IC10 in order to set the white balance with the signal corresponding to the center image. The clamped burst flag pulse is gated by the W.BL pulse, the burst flag pulse is removed and only the clamp DC voltage is detected as a reference DC voltage. The gated signals are converted into the DC voltage in the detection circuit and fed through pins 18, 19 and 20 of IC10 to the white balance setting circuit.

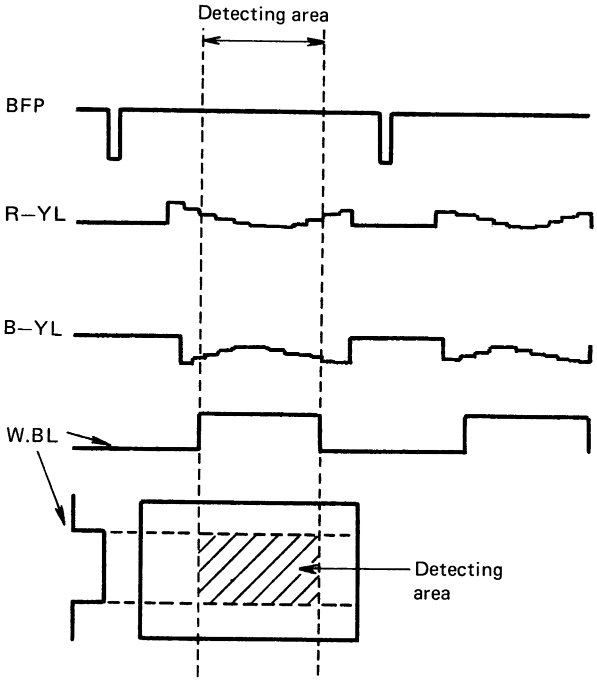


Fig. 4-6-4 White Set Detection

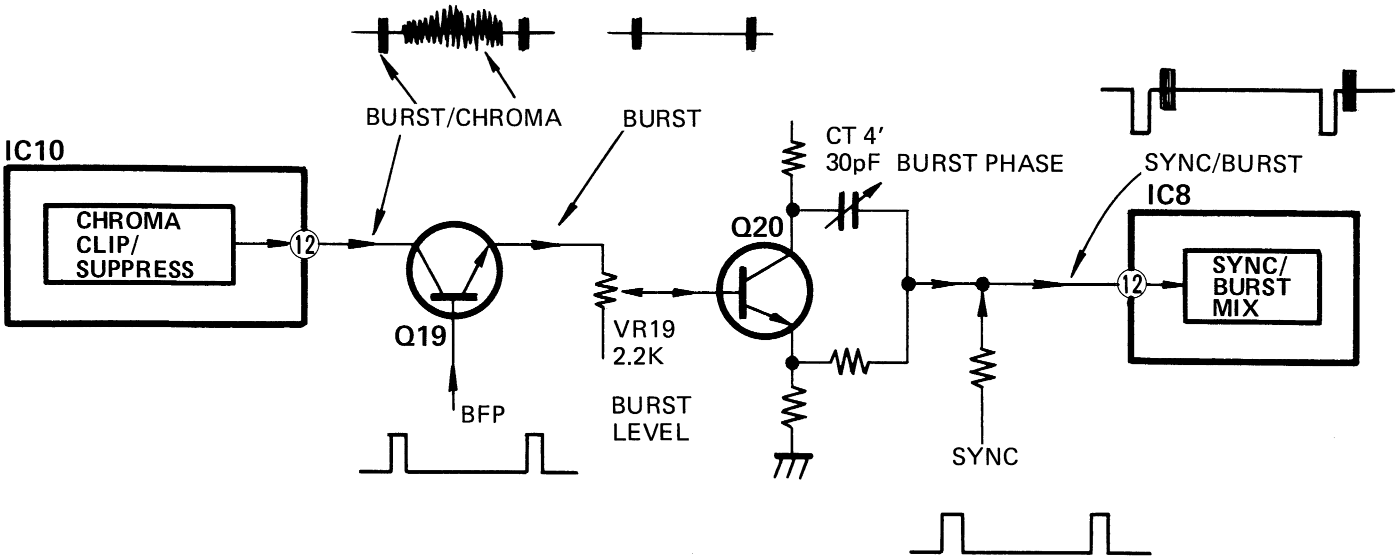


Fig. 4-7 Burst Generator Circuit

4-7 Burst Generator Circuit

Outline

This circuit gates the burst signal from the mixed signal of the chrominance and burst signals supplied from the chroma encoding circuit and phase-shifted burst is generated. The burst signal is fed to the video processing circuit together with the sync signal.

Details

The mixed signal of chrominance and burst signal is fed from pin 12 of IC10 to the collector of burst gate Q19. The burst flag pulse (BFP) is fed from the pulse generator circuit to the base of Q19 to gate the burst signal. The gated burst signal at the collector of Q19 is then fed to phase shifter Q20 through VR19 (BURST LEVEL). The phase-shifted burst signal at the junction point of CT4 (BURST PHASE) and R161 is then mixed with the sync pulse comes from the pulse generator circuit. The mixed signal is supplied to video processing circuit to from a composite NTSC signal.

4-8 1/2 fH Beat Prevention Circuit

Outline

In this color camera, the red(R) and blue(B) signals are obtained from the modulated R and B signals of odd-number scanning lines and the modulated R and B signals of even-number scanning lines either by adding or subtracting them.

It should also be noted that the levels of the R and B signals on odd-numbered and even-numbered scanning lines are not equal due to the different transparency of the stripe filter integrated in surface of pick-up tube and decoding process necessary for separation.
Therefore, the chroma signal level obtained after modulation of R-Y_L and B-Y_L signals differs between the even-numbered lines and the odd-numbered lines, causing a level difference.
Thus, this level difference appears on the monitor as an 1/2fH beat (i.e., seen as line pairing of chroma). To remove this beat, the chroma signal level of each horizontal line is averaged by adding a delayed 1H chroma signal and an un-delayed chroma signal to make a chroma signal without beat or differences.

Details

The chrominance signal from pin 12 of IC10 is supplied to 1H delay line DL2. The 1H-delayed chroma signal is mixed with the non-delayed chroma signal which is fed through R145.
After its level is set by VR17 (CHROMA GAIN), the averaged chroma signal is fed to the video signal processing circuit through pin 22 of IC8.
Q16 and Q32 remove the burst signal from the mixing signal of the chrominance and burst signals. The positive preblanking (PRE BL) pulse is fed to the base of Q16and Q32. They turn ON during the blanking period of chrominance signal. In this way, the burst signal is removed. The burst signal is mixed in the video signal processing circuit to form the composite NTSC signal.

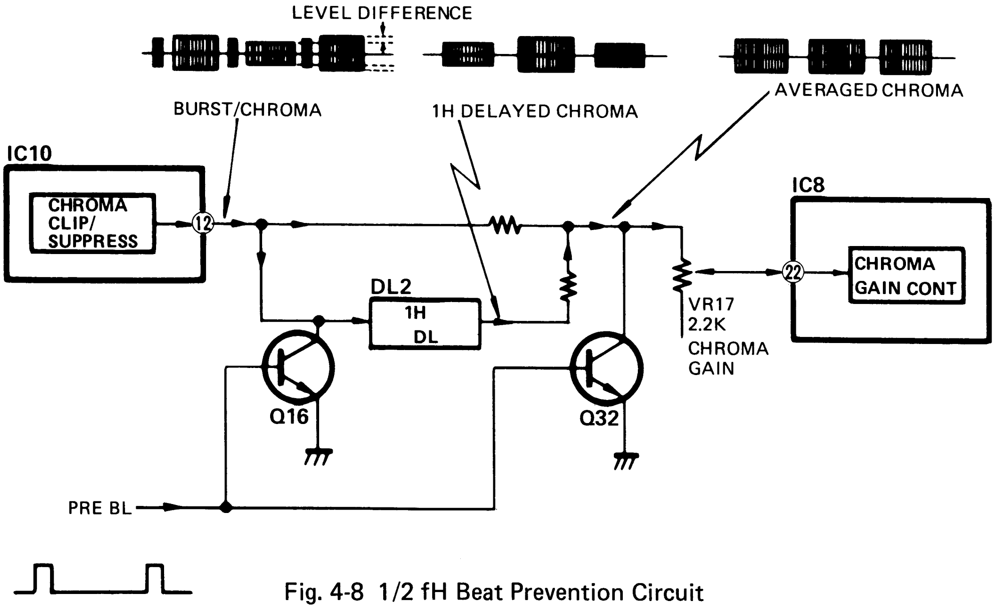

LEVEL DIFFERENCE
BURST/CHROMA
1H DELAYED CHROMA
AVERAGED CHROMA
IC10
CHROMA CLIP/ SUPPRESS
12
IC8
22
CHROMA GAIN CONT
DL2
1H DL
VR17
2.2K
CHROMA GAIN
Q16
Q32
PRE BL

Fig. 4-8 1/2 fH Beat Prevention Circuit

4-9 Video Signal Processing Circuit

Outline

In this circuit, the chrominance signal, the luminance signal, the title character signal, the blanking signal, the burst signal and the sync signal are mixed to produce a composite NTSC signal.
The negative colored NTSC signal and fade-in/out effect are also made in this circuit. The NTSC signal is applied to the portable VTR, or a desk-top type VTR through the power supply.

Details

The chrominance signal is supplied from the 1/2fH beat prevention circuit to the chroma gain control circuit inside IC8 through pin 22. The positive vertical edge signal from the vertical edge signal generator, AGC detect DC signal and the chroma clip signal from the chroma clip signal circuit are mixed together through R47, R44/R46 and R51 and fed via pin 20 to the chroma gain control circuit, where these signals control/ reduce the chrominance signal level of the edge of white object.

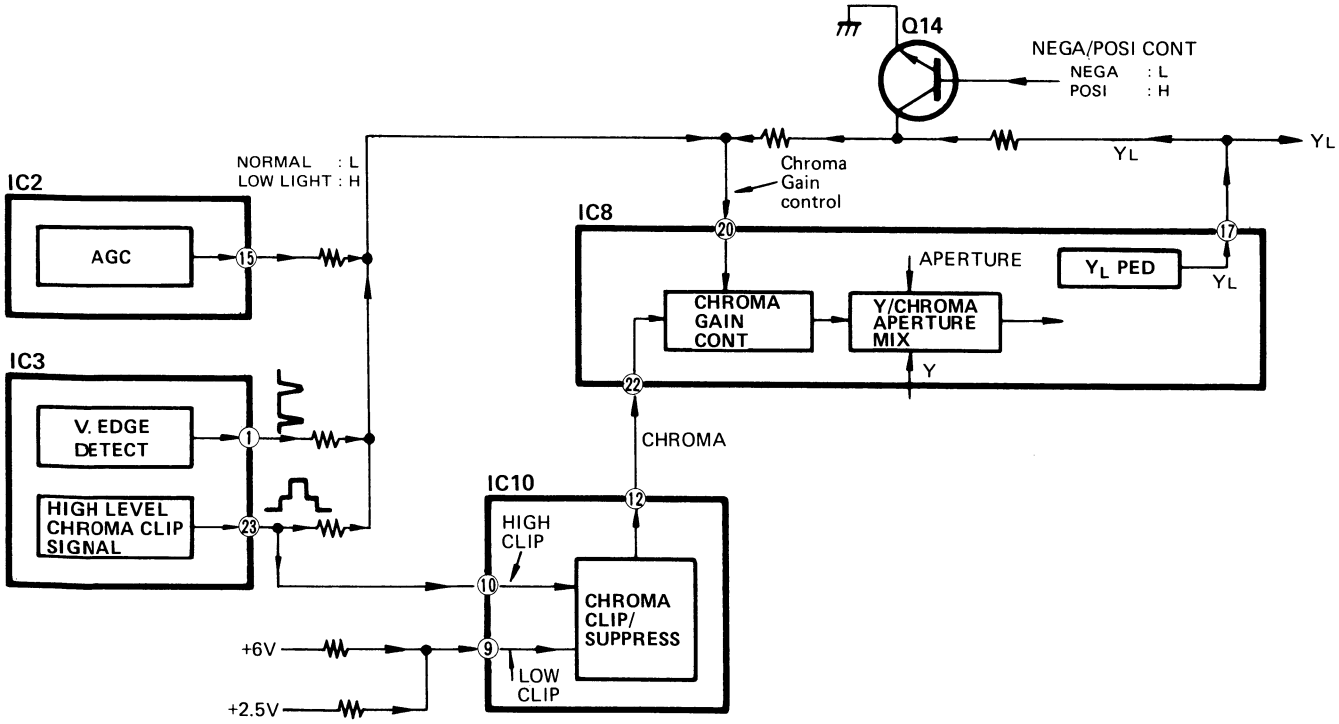

Q14
NEGA/POSI CONT
NEGA : L
POSI : H
YL
YL
NORMAL : L
LOW LIGHT : H
IC2
AGC
15
Chroma Gain control
IC8
20
17
APERTURE
YL PED
YL
CHROMA GAIN CONT
Y/CHROMA APERTURE MIX
Y
22
IC3
V. EDGE DETECT
1
HIGH LEVEL CHROMA CLIP SIGNAL
23
CHROMA
IC10
12
HIGH CLIP
10
CHROMA CLIP/ SUPPRESS
+6V
9
LOW CLIP
+2.5V

Fig. 4-9-1 Chroma Gain Control Circuit

In the chroma clip/suppress circuit previously explained, the green color which results when the excessively bright object is shot with the camera is clipped by the chroma clip signal. (Refer for the detail to Chroma Clip/Suppress Circuit.) The chroma clip signal supplied to the chroma gain control circuit minimizes the remaining chrominance signal corresponding to the excessively bright object.

The vertical transient spurious correction circuit previously described minimizes the unnatural color appears at the vertical edge of object. (Refer for the detail to Vertical Transient Spurious Correction Circuit.) The positive vertical edge signal supplied to the chroma gain control circuit decreases the chrominance signal corresponding to the unnatural color at the vertical edge. The chrominance signal undergoes the chroma gain control is fed to the Y/chroma/aperture mixing circuit inside IC8. The mixed signal of the luminance (Y_H) signal and the vertical(V) edge signal is fed to the Y/CHROMA/APERTURE mixing circuit.

The horizontal aperture signal from the horizontal(H) aperture generator circuit and the H.aperture suppress circuit to the mixing circuit through pin 4 of IC8. In the mixing circuit, these signals are mixed.

The mixed signal is supplied to the fade circuit where its signal level is controlled by the fade control signal supplied from the fade/recording control circuit through pin 24 of IC8. (Refer for the details to fade/recording control circuit.)

Next, the mixed signal is supplied to the NEGA/POSI select circuit.

When the camera is used in the positive picture condition, the high level of nega/posi control signal is fed from the Micro processor board through terminal No. 3 of BI2 and pin 21 of IC8 to the negative/positive select circuit for selecting the positive position and the normal picture is observed.

If the nega/posi select switch on the side of camera is pressed, the nega/posi control signal is converted from the high level to the low level and the negative position is selected. Therefore when the camera is used for shooting the negative film, the normal picture can be observed by pressing the nega/posi select switch on the side.

However, since the color reproduction characteristic of negative film is different, the chrominance signal amplitude corresponding to the high Y level is extremely high. Q14 suppresses the chrominance signal when the camera is used in the negative position. In the negative position, the low level of nega/posi control signal is fed to the base of Q14 turning OFF Q14. When the Q14 is turned OFF, the Y_L signal obtained at pin 17 of IC14 is fed through R128, R125 and pin 20 of IC8 to the chroma gain control circuit where the Y_L signal suppresses the chrominance signal corresponding to the high Y level. In the positive position, the high level is sent to the base of Q14 and Q14 is turned ON. Therefore, the Y_L signal is not fed to the chroma gain control circuit.

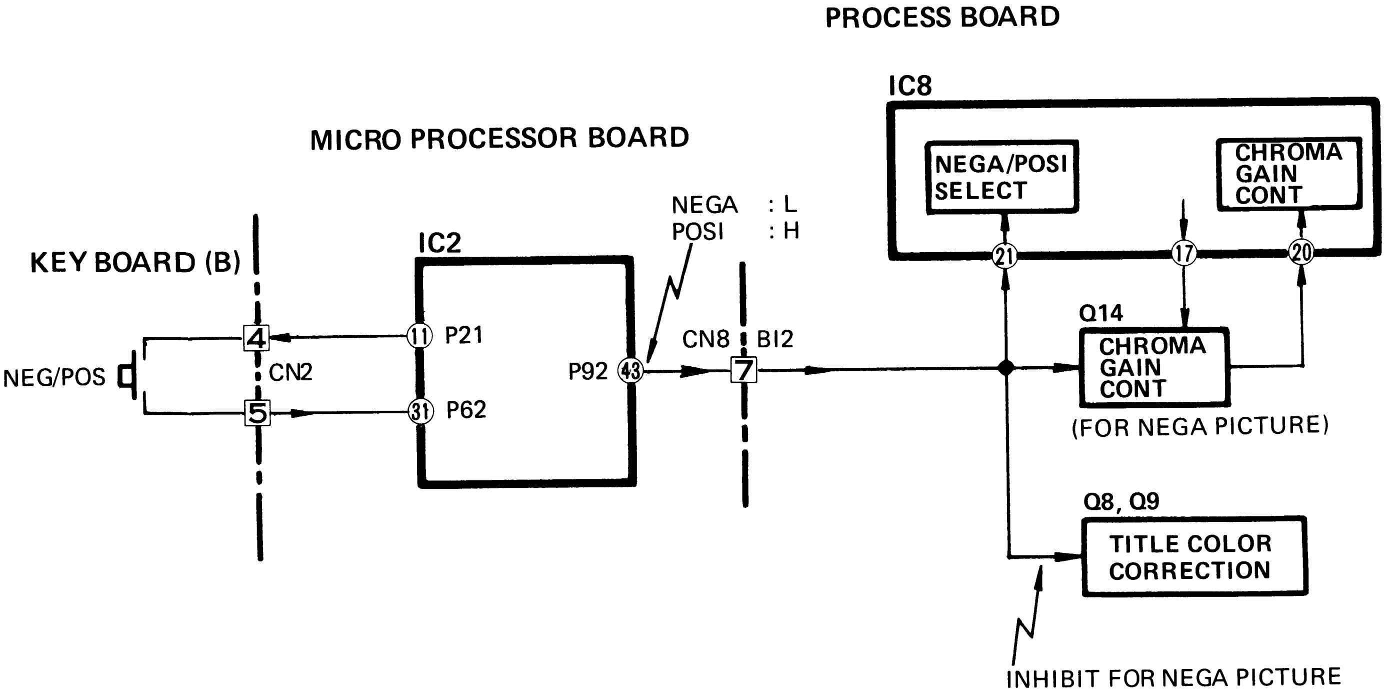


Fig. 4-9-2 NEGA/POSI Select Circuit

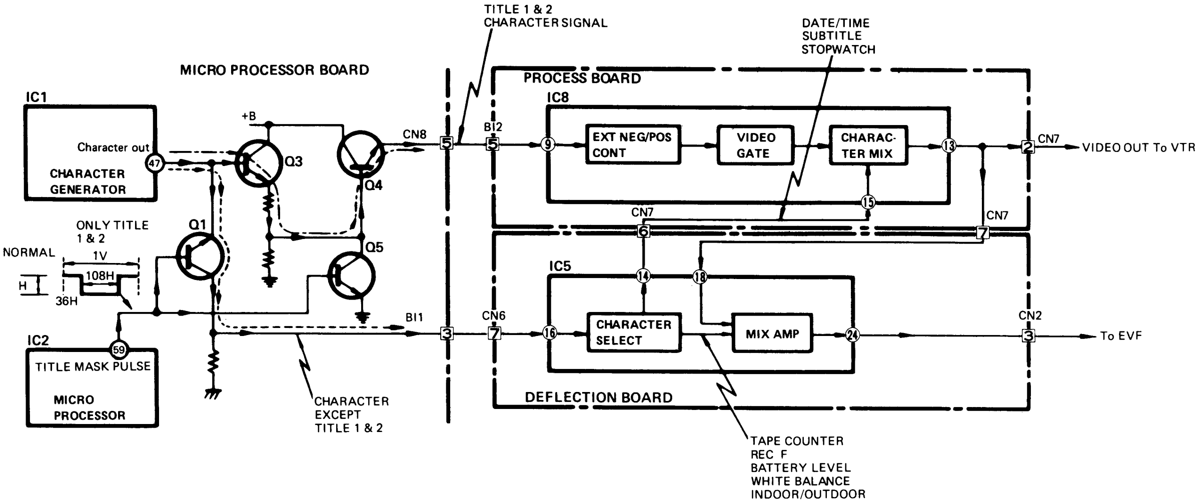

TITLE 1 & 2
CHARACTER SIGNAL
DATE/TIME
SUBTITLE
STOPWATCH
MICRO PROCESSOR BOARD
PROCESS BOARD
IC1
Character out
CHARACTER GENERATOR
47
+B
Q3
Q4
Q5
Q1
CN8
5
BI2
IC8
9
EXT NEG/POS CONT
VIDEO GATE
CHARAC-TER MIX
13
15
CN7
2
VIDEO OUT To VTR
CN7
6
7
ONLY TITLE 1 & 2
NORMAL
1V
108H
36H
H
IC2
59
TITLE MASK PULSE
MICRO PROCESSOR
BI1
3
CN6
7
IC5
14
18
16
CHARACTER SELECT
MIX AMP
24
CN2
3
To EVF
DEFLECTION BOARD
CHARACTER EXCEPT TITLE 1 & 2
TAPE COUNTER
REC F
BATTERY LEVEL
WHITE BALANCE
INDOOR/OUTDOOR

Fig. 4-9-3 Title 1 & 2 Character Signal Circuit-1

The mixed signal is then applied to the title mixing circuit.

The title 1 & 2 character signals generated in Micro processor board is mixed with Y/Chroma signal. The title color/chroma signal is also mixed.

The title 1 & 2 character signal generated in IC1 on Micro processor board and supplied to the character select circuit consisting of Q3,Q4 and Q5 through pin 41 of IC1. The title 1 & 2 character signals are then fed to pin 9 of IC8 on process board to mix with the video signal.

However, title 1 & 2 character signals can only be passed through the character select circuit. The character signals except title 1 & 2 are supplied to character select circuit in IC5 on Deflection board.

At the EXT VIDEO NEG/POS CONT section, the character signal polarity is selected by the external title polarity signal supplied from pin 8 of IC1 on Micro processor board to pin 5 of IC8 on Process board. When the external title polarity signal is high, the output video signal becomes colored title with picture. When the external title polarity signal is changed to low, the keyed picture with backcolor is generated.

The polarity selected character signal is then sent to the video gate circuit in IC8 on Process board.

At the video gate circuit, the Y/Chroma signal is gated/eliminated by the character signal and the title color/chroma signal is then inserted to the part of Y/Chroma signal which is eliminated by character signal.

However, the title color/chroma signal is generated at IC1 on process board and its color is controlled by the title color select DC signal generated at pins 2,3 and 6 of IC1 on Micro processor board. The (R-Y)SC and (B-Y) SC are also supplied from pins 5 and 6 of sync generator IC11 to pins 6 and 7 of IC1 respectively.

The generated title color/chroma signal obtained at pin 9 of IC1 is applied to title color phase shifter consisting of Q2,Q3 and Q31 on Process board and its phase is adjusted by CT1 (TITLE COLOR PHASE) to become specified phase. After that, the title color/chroma signal is fed to pin 10 of IC8, video gate circuit to insert it to Y/Chroma mixed signal.

PIN No. / COLOR	②	③	⑥
WHT (WHITE)	L	L	L
MGT (MAGENTA)	H	L	L
YLW (YELLOW)	L	H	L
CYN (CYAN)	H	H	L
BLU (BLUE)	H	L	H
GRN (GREEN)	L	H	H
RED	H	H	H

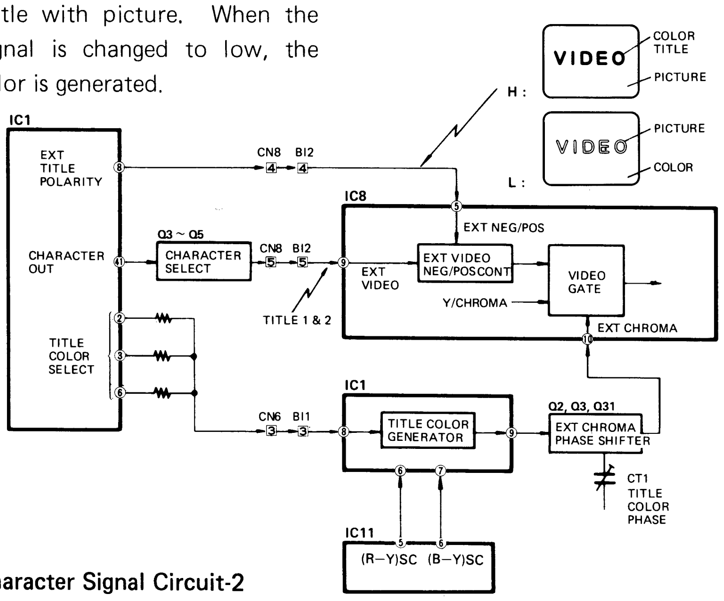

VIDEO
COLOR
TITLE
PICTURE
H :
VIDEO
PICTURE
COLOR
L :
IC1
EXT TITLE POLARITY
8
CN8 BI2
4
4
IC8
5
EXT NEG/POS
CHARACTER OUT
41
Q3 ~ Q5
CHARACTER SELECT
CN8 BI2
5
5
9
EXT VIDEO
EXT VIDEO NEG/POS CONT
VIDEO GATE
Y/CHROMA
TITLE 1 & 2
EXT CHROMA
10
TITLE COLOR SELECT
2
3
6
IC1
Q2, Q3, Q31
CN6 BI1
3
3
8
TITLE COLOR GENERATOR
9
EXT CHROMA PHASE SHIFTER
6
7
CT1
TITLE COLOR PHASE
IC11
5
6
(R–Y)SC (B–Y)SC

Fig. 4-9-4 Title 1 & 2 Character Signal Circuit-2

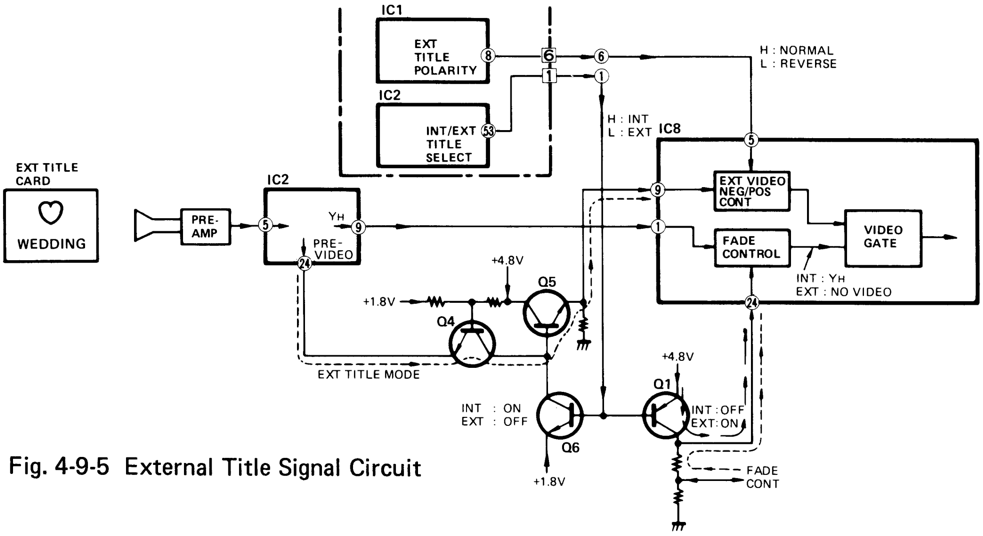

IC1
EXT TITLE POLARITY
IC2
INT/EXT TITLE SELECT
H : NORMAL
L : REVERSE
H : INT
L : EXT
IC8
EXT TITLE CARD
WEDDING
PRE-AMP
IC2
YH
PRE-VIDEO
EXT VIDEO NEG/POS CONT
FADE CONTROL
VIDEO GATE
INT : YH
EXT : NO VIDEO
+4.8V
+1.8V
Q5
Q4
EXT TITLE MODE
+4.8V
Q1
INT : ON
EXT : OFF
INT :OFF
EXT:ON
Q6
+1.8V
FADE CONT

Fig. 4-9-5 External Title Signal Circuit

When the external title (EXT TITLE) mode is selected, the INT/EXT TITLE SELECT signal from pin 53 of IC2 on Micro processor board is changed from high (INT) to low (EXT) and it is supplied to both bases of Q1 and Q6 on Process board so that Q1 is turned ON and Q6 is turned OFF.

The external title video signal from Preamplifier board through pin 5 and 24 of IC2 on Process board is fed to pin 9 of IC8 through Q4 and Q5.

THe external title video signal is then supplied to EXT NEG/POS CONT circuit in IC8 where its polarity is controlled by the external title polarity signal fed from pin 8 of IC1 on Micro processor board through pin 5 of IC8 on Process board.

The external title video signal is then applied to the video gate circuit.

However, YH signal from pin 9 of CI2 on Process board is shut off by the high voltage supplied from the collector of Q1 to pin 24 of IC8 and fade control circuit by turned ON Q1.

Since the circuit designing of video gate circuit in IC8 on Process board, the luminance (Y) signal level of title color signal inserted is always the same level even if the different color is selected.

As a result, especially red and blue title colors become different colors (too high luminance). Therefore, title color correction circuit reduces the luminance level of red and blue title color.

When red or blue title color is selected, the high level of title color correction signal supplied from Micro processor board is fed to the base of Q8 so that Q8 turns OFF and Q9 turns ON. The positive polarity blanking pulse (BL) generated at pin 13 of IC11 is converted into the negative polarity by Q9 and is mixed to the base of Q12 and pin 1 of IC8. The Y signal blanking level at pin 1 of IC8 becomes bigger than that of without correction. The title color signal is then mixed with Y signal whose blanking/pedestal level corrected at the video gate circuit. Next, the negative polarity mixed signal obtained at pin 6 of IC8 and the negative polarity blanking signal are mixed at the base of Q12 to cancel the blanking level which is previously corrected at pin 1 of IC8. As a result, the blanking level of Y signal does not change by title color correction but that of red and blue title color are reduced for produce the better color.

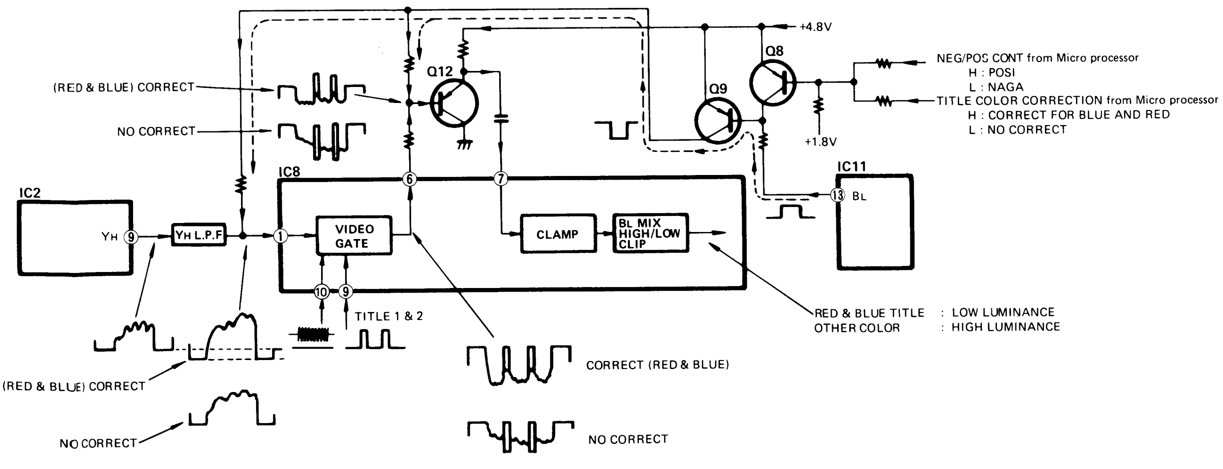

(RED & BLUE) CORRECT
NO CORRECT
Q12
+4.8V
Q8
Q9
NEG/POS CONT from Micro processor
H : POSI
L : NAGA
TITLE COLOR CORRECTION from Micro processor
H : CORRECT FOR BLUE AND RED
L : NO CORRECT
+1.8V
IC8
IC2
IC11
BL
YH
YH L.P.F
VIDEO GATE
CLAMP
BL MIX HIGH/LOW CLIP
TITLE 1 & 2
RED & BLUE TITLE : LOW LUMINANCE
OTHER COLOR : HIGH LUMINANCE
CORRECT (RED & BLUE)
NO CORRECT
(RED & BLUE) CORRECT
NO CORRECT

Fig. 4-9-6 Title Color Correction Circuit

The mixed signal is then fed to the character mix circuit where the characters/graphics signals such as subtitle, stopwatch and date superimposed onto the NTSC signal. The characters/graphics signals are sent from the Deflection board through pin 15 of IC8. The mixed signal is forwarded through pin 6, Q12 and pin 7 of IC8 to the clamp circuit, where the blanking level of the mixed signal is clamped by the clamp pulse-2 (CP2) supplied from the pulse separator inside IC8. The clamped signal is then sent to the BL mix/high clip/low clip circuit, where it is mixed with the blanking (BL) pulse.

The high clip circuit clips the signal exceeds 120 IRE unit (8.5V) and the low clip circuit clips the low level portion of mixed signal for setting the pedestal level. The mixed signal of chrominance and luminance signals which undergoes the high and low clip is mixed with the mixing signal of sync and burst signal in the video output circuit forming a composite NTSC signal.

The NTSC signal at pin 13 of IC8 is supplied to the VTR.

The NTSC signal is also supplied to 3.58MHz trap CF6 where the chrominance signal is removed and the luminance signal remains. The luminance signal is then fed to the electronic viewfinder through the Deflection board.

4-10 Playback Detect Circuit

Outline

This circuit detects the recording or playback mode of the portable VTR and sends the detected information to the Audio/Lens control board.

When the portable VTR is set into the recording mode, camera supplies the NTSC output signal to the viewfinder and the portable VTR for recording.

When the portable VTR is set into the playback mode, the playback control signal shuts OFF the camera function and supplies the playback video signal from VTR to the viewfinder and close lens iris to protect pick-up tube from burning.

Details

When the portable VTR is set into the recording mode, no DC voltage is applied through R113 to the base of Q11 so that Q11 and Q10 turn OFF. The low level obtained at the collector of Q10 is fed to the anode of D7 and D7 turns OFF. Therefore, the video output circuit works properly and sends the video signal to the viewfinder and the portable VTR for recording.

When the portable VTR is set into the playback mode, the playback video signal which rides on top of +6V DC is supplied from the VTR through terminal No. 2 of CN9. The playback signal is removed by C46 and the remaining +6V DC is fed to the base of Q11 so that Q11 and Q10 turn ON.

The high level obtained at the collector of Q10 is fed to the anode of D7 turning ON D7.

The high level is supplied to the video output circuit to shut it OFF. In this way the video signal is not generated in the camera and only playback signal from the portable VTR is supplied to the viewfinder through trap CF6.

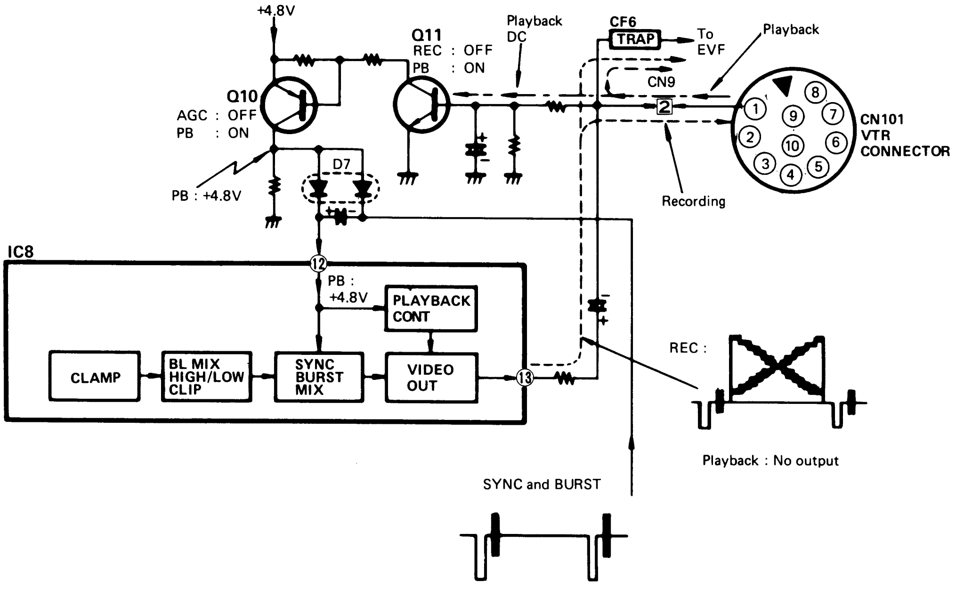


Fig. 4-10 Playback Detect Circuit

4-11 White Balance Setting Circuit

Outline

This circuit automatically sets the white balance of picture by controlling the amplitude of red and blue signals respectively. (Proper white balance or color balance means that the camera will reproduce a white object in the picture as white.)

Since the scene illumination contributes to color in balance, a diffusion filter is placed between the lens and the pick-up tube when the white set switch is placed in the SET position. Therefore, white setting uses the same light as will be used later.

When the SET position is chosen, the automatic cycle in the camera increases or decreases R and B signals in step and stops when each of these levels is equal to the green (Y_L) level. At this point, the R-Y_L and B-Y_L signals are both 0(zero), the picture is white and white balance has been achieved.

This is indicated by the graphics displayed in the viewfinder. The blinking graphics WHITE will be displayed after the power switch is turned ON and while the white balance is being set. The graphics WHITE BAL OK is displayed or blinking WHITE disappears when the automatic white balance processed is finished.

Details

When the power switch is turned ON, the positive reset pulse is generated in the Deflection board. This reset pulse is fed through terminal No. 4 of CN6 to pin 9 of IC2 and IC2 is reset. The DC voltage made by the resetting and obtained at pin 8 of Z4 and pin 8 of Z1 are supplied to the gain control circuit in the R-Y_L and B-Y_L signal circuits through pin 7 and pin 6 of CN7 to set the initial gain of R and B signals respectively. As a result, the R signal and B signal levels are set and camera will produce average white balance for 3200°K illumination when the power is first applied.

At this time, the blinking graphics WHITE is displayed on the viewfinder. When the graphics are displayed, the white balance should be set by placing the white set switch SW1 on the side of camera to the SET position while aiming the camera at the white object or white paper.

When the white set switch SW1 is placed to the SET position, pin 1 of IC3 is connected to ground, the 6-bit up/down counters start counting up or down depending on the levels at pin 2 and pin 7 of IC4. As the counters count up or down the digital/analog (D/A) converter consisting of Z3/Z4 and Z1/Z2 produce staircase signals. The voltage levels of these D/A converter will set the R and B gain.

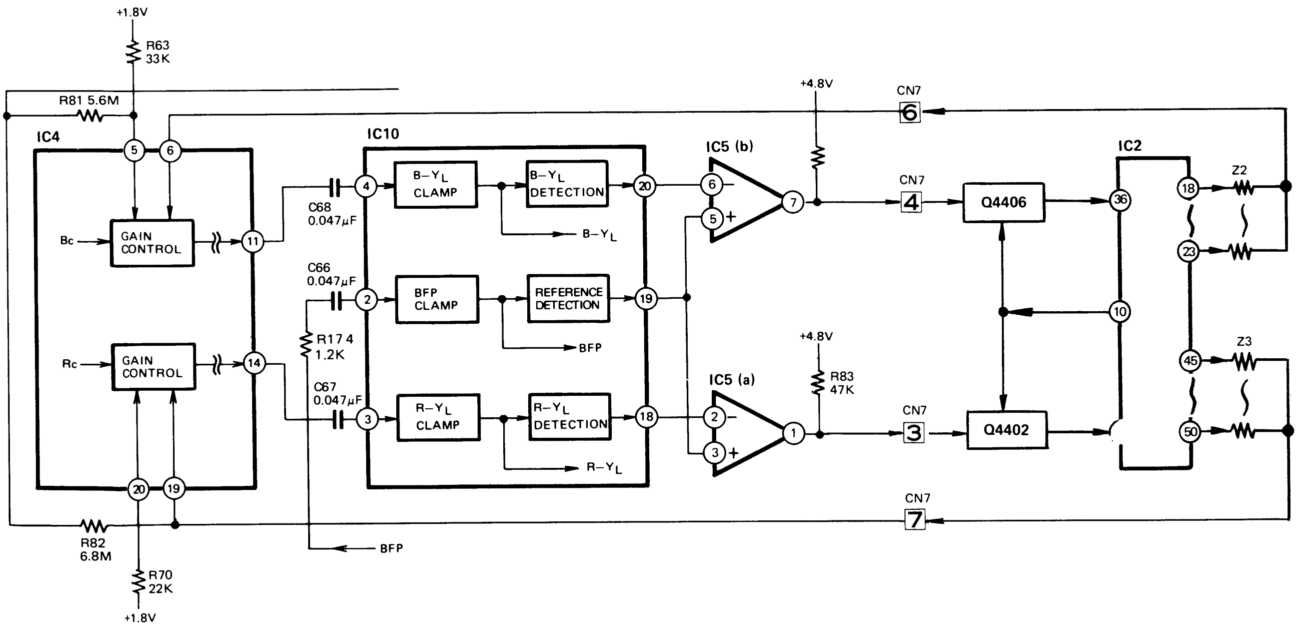

+1.8V
R63
33K
R81 5.6M
IC4
5
6
Bc
GAIN CONTROL
11
Rc
GAIN CONTROL
14
20
19
R82
6.8M
R70
22K
+1.8V
IC10
C68
0.047μF
C66
0.047μF
R174
1.2K
C67
0.047μF
4
2
3
B-YL CLAMP
B-YL DETECTION
B-YL
BFP CLAMP
REFERENCE DETECTION
BFP
R-YL CLAMP
R-YL DETECTION
R-YL
20
19
18
BFP
+4.8V
IC5 (b)
6
5
7
+4.8V
R83
47K
IC5 (a)
2
3
1
CN7
6
CN7
4
CN7
3
CN7
7
Q4406
Q4402
IC2
36
10
18
23
45
50
Z2
Z3

Fig. 4-11 White Balance Setting Circuit

These DC voltages are sent to the gain control circuit in IC4 and control the R and B signal levels which was initially set for 3200°K illumination. As the increasing or decreasing voltages made by the stairsteps raise the gain of R and B channels, the levels of R-Y_L and B-Y_L signal increase or decrease at pins 14 and 11 of IC4. To determine for the up/down counters counting up or down, an Op-amp for each channel (IC5 pins 5, 6, 7 for red, pins 1, 2, 3 for blue) compares the detected signal levels (DC) which appear at IC10 (pin 18 : R-Y_L detected DC, pin 20 : B-Y_L detected DC, pin 19 : reference detected DC). The outputs of comparison at pin 7 and pin 1 of IC5 are sent to the micro processor through pins 3 and 4 of CN7.

The output of comparator at pin 7 is high when the R signal level is below the Y_L signal (The R-Y_L detected DC level is below the reference detected DC level.), and the counter starts counting up.

The increased DC voltage from the D/A converter is fed to the red gain control circuit to increase the red signal level.

When the R signal just exceeds the Y_L signal, the comparator switches its output to low and the counter starts counting down. The decreased DC voltage reduces the R signal level. This loop works until the R signal level is equal to the Y_L signal. The B channel works in a similar fashion.

The counters stop counting automatically about 3 seconds after the white set switch SW1 is placed to the SET position and white balance has been achieved. At the same time, the blinking graphics WHITE goes OFF from the viewfinder or the graphics WHITE BAL OK are displayed.

Since the diffusion filter has itself an inherent color filtering effect, the white balance shifts slightly when the white setting is accomplished and diffusion filter is removed. When in the white set mode, the gains of gain control circuits for the R and B signal are slightly shifted by grounding the R82 and R81 and the white balance is set. When the white setting is accomplished and the white set switch is placed in the normal mode the gains are returned to the previous mode for an almost exact match.

4-12 VTR Remote Control/Fade Control Circuit

This circuit consists of the VTR remote control circuit and the fade control circuit.

4-12-1 VTR Remote Control Circuit

Outline

This circuit generates VTR start/stop (pause) control signal. When the VTR is set to the recording mode, the VTR is started by a high potential from this circuit. If a low potential is sent to the VTR, it stops (pauses). This circuit also has the VTR compatibility switch for other VTR which is started by a low potential and stopped by a high potential.

Details

When the VTR compatibility switch SW3 is set in the + (normal) position and the VTR is set in the recording mode if the power switch is turned ON, the potential at pin 17 and pin 19 of IC1 are set to high respectively by the reset pulse supplied to pin 7 of IC1 from Micro processor. The high at pin 17 is fed to the Micro processor board and the graphics REC is not displayed in the viewfinder.

The high at pin 51 of IC2 (Micro Processor) is supplied to the base of Q13 so that Q13 turns ON. The low obtained at the collector of Q13 is supplied to VTR through pin 6 of camera cable to set the VTR to REC/PAUSE mode.

When the non-lock type VTR start/stop switch SW701 is depressed (refer to 1ST TRIGGER), the negative trigger pulse is generated. It is fed to pin 1 of IC4 through Q17. The low at pin 51 of IC2 is fed to Q13 and the high at the collector of Q13 is fed to the VTR to start recording.

At the same time, the low at pin 17 of IC1 is sent to the Micro processor board and the blinking graphics REC is displayed in the viewfinder.

When the subsequent trigger pulse is sent to pin 1 of IC4 by depressing SW701 again (refer to 2ND TRIGGER), the potential at pin 51 of IC2 and pin 17 of IC1 is inverted. As a result, the VTR is stopped and the blinking REC graphics go OFF.

The VTR compatibility switch SW1 inverts the potential of VTR recording control signal at pin 51 of IC2 for other VTR which starts with low potential and stops with high potential.

When the portable VTR is set to the playback mode, an inhibit (Tally) signal (high level) from the VTR is supplied to pin 37 of IC2 to inhibit the trigger pulse from the VTR start/stop switch SW701. Therefore, the REC graphics are not displayed in the viewfinder. This condition is maintained until the playback mode is released and set to the recording mode again.

When the standby switch on the side of the camera is set to the standby mode, the high potential is fed to the base of Q21 from the collector of Q12 for setting the potential at pin 6 of VTR cable to low. Also the high potential at the collector of Q12 is supplied to pin 5 of camera cable through Audio/Lens Control board to set the VTR to standby mode. The condition is maintained until the standby switch is reset to the ON position.

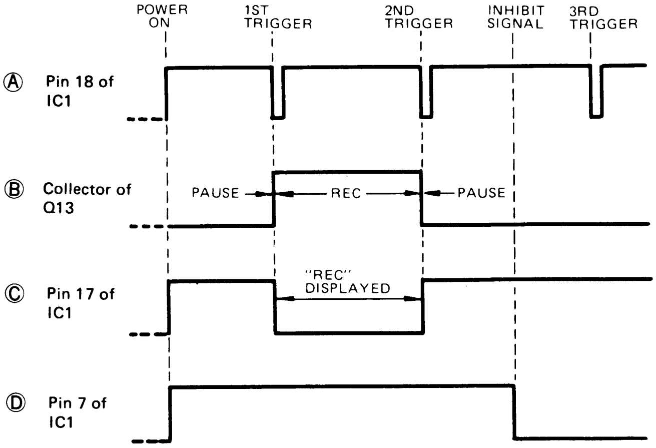


Fig. 4-12-1 VTR Remote Control

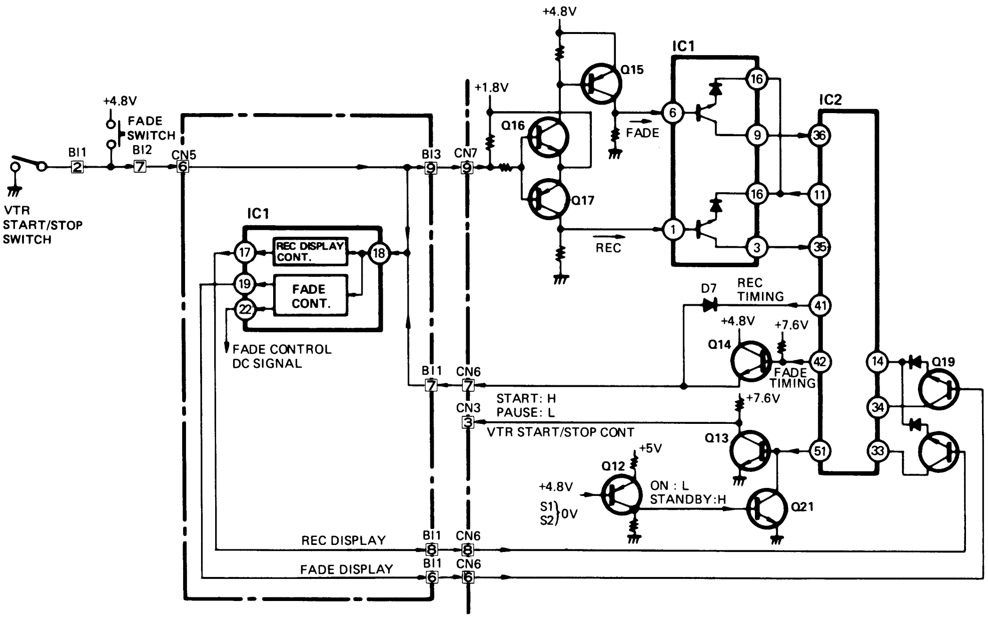

+4.8V
FADE SWITCH
BI1
BI2
CN5
VTR START/STOP SWITCH
IC1
REC DISPLAY CONT.
FADE CONT.
FADE CONTROL DC SIGNAL
+1.8V
Q16
BI3
CN7
Q15
Q17
FADE
REC
IC1
IC2
D7
REC TIMING
+4.8V
+7.6V
Q14
FADE TIMING
Q19
BI1
CN6
START: H
PAUSE: L
CN3
VTR START/STOP CONT
+5V
Q12
Q13
+7.6V
+4.8V
S1
S2
0V
ON : L
STANDBY:H
Q21
REC DISPLAY
FADE DISPLAY

Fig. 4-12-2 VTR Remote Control/Fade Control Circuit

4-12-2 Fade Control Circuit

Outline

This circuit generates the fade control signal and sends it to the video signal processing circuit and Audio circuit to control the fade-in/out effects.

When the VTR is in recording mode, if the VTR start/stop switch is depressed after pressing the fade switch, the fade-out effect is obtained and the VTR pauses, then the picture appears again.

If the VTR is in pause, depressing the VTR start/stop switch after pressing the fade switch, the video will fade out, the VTR starts recording and the video fades in again.

If the VTR start/stop switch is depressed without pressing the fade switch, no fade effect occurs and the VTR is remote-controlled as described in VTR remote control circuit.

Details

. Fade-in effect

When the momentary fade switch SW3 is depressed (E , 1ST TRIGGER), the DC level at pin 18 of IC1 becomes high. This high level initiates the fade/rec control circuit in IC1. This trigger signal E changes the potential at pin 19 of IC1 from high to low J . The low level is fed to the Micro processor board and the graphics F is displayed in the viewfinder. Then when the VTR start/stop switch SW701 is depressed (F , 1ST TRIGGER), pin 18 of IC1 goes low and the DC level at pin 22 starts increasing gradually (H).

After about few seconds the potential at pin 51 of IC2 (Micro Processor) becomes low (L) and the collector of Q12 becomes high to set the VTR starts recording. The potential at pin 17 of IC1 goes low (K) and it is fed to the Micro processor board to display the blinking graphics REC in the viewfinder. Simultaneously the DC level at pin 22 starts decreasing gradually. This DC level H at pin 22 is fed to the fade control circuit in the video signal processing circuit to control the video signal level (I).

This means that the VTR start/stop switch is pressed, the video signal is decreased gradually at first and then appears again gradually (fade-in effect) after recording starts. Therefore the recording proceeds as shown M .

When the fade-in effect is completed, the potential at pin 19 of IC1 is changed from low to high (J) and the graphics F goes OFF.

If the VTR start/stop switch SW701 is depressed independently after fade-in effect is accomplished (F , 2ND and 3RD TRIGGER), the VTR can be controlled remotely as previously described in VTR remote control circuit.

If the fade switch SW3 is depressed again after it is initially pressed (E , 3RD and 4TH TRIGGER), the initial setting for fade effect will be cancelled.

. Fade-out effect

As in the case of fade-in effect, if the VTR start/stop switch SW701 is depressed (F , 4TH TRIGGER) after pressing the fade switch SW3 (E , 2ND TRIGGER), the DC level at pin 22 of IC1 starts increasing gradually to fade-out the video. After few seconds, the potential at pin 51 of IC2 (Micro Processor) changes from low to high and VTR stops (pauses). This DC level decreasing gradually at pin 22 is fed to the fade control circuit to control the video signal level.

When the VTR start/stop switch is pressed after depressing the fade switch, the picture disappears at first (fade-out effect), VTR pauses and then the picture appears again gradually for next recording.

When the VTR stops, both the graphics REC and F disappears from the viewfinder.

When the portable VTR is set to the playback mode or the standby switch is set to the standby position, pin 7 of IC1 becomes low and the fade/rec control circuit is reset as described in VTR Remote Control Circuit. Therefore the fade/rec control circuit is not controlled by depressing the VTR start/stop switch and the fade switch.

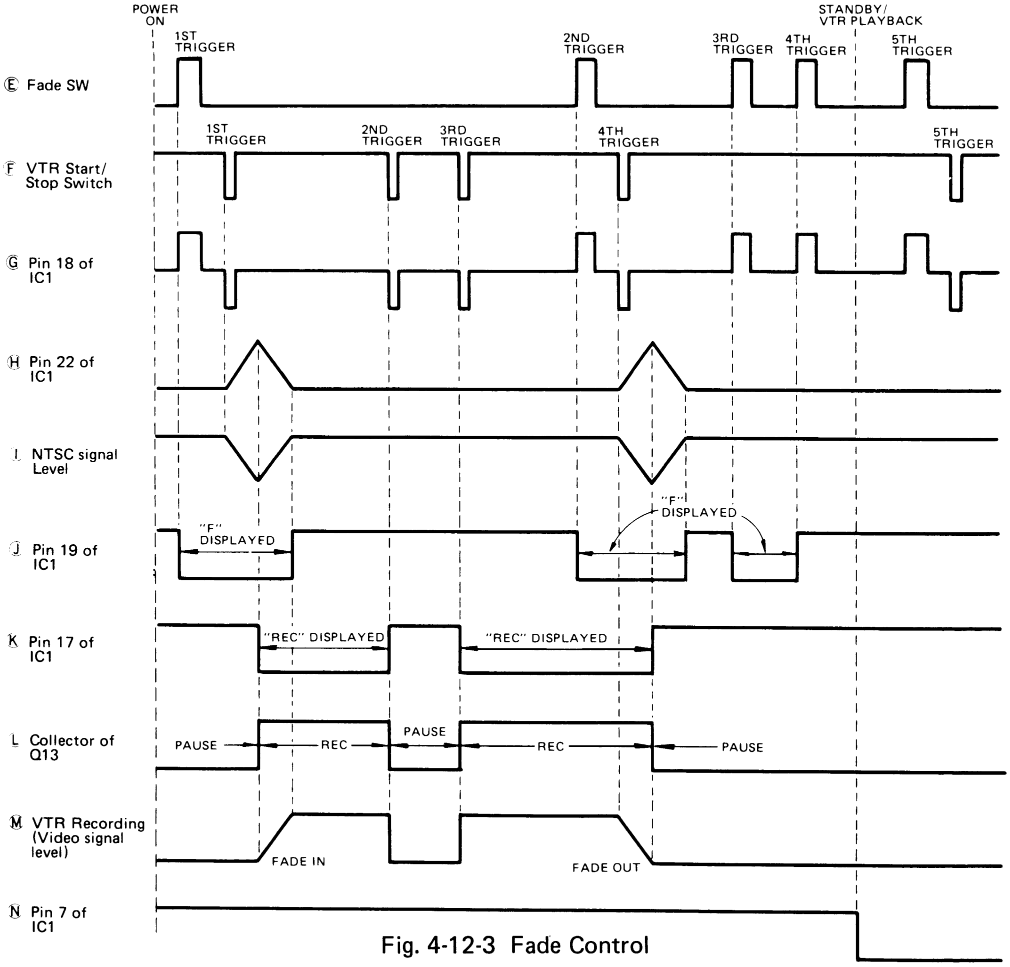

POWER ON
1ST TRIGGER
2ND TRIGGER
3RD TRIGGER
4TH TRIGGER
STANDBY/ VTR PLAYBACK
5TH TRIGGER
Ⓔ Fade SW
1ST TRIGGER
2ND TRIGGER
3RD TRIGGER
4TH TRIGGER
5TH TRIGGER
Ⓕ VTR Start/ Stop Switch
Ⓖ Pin 18 of IC1
Ⓗ Pin 22 of IC1
Ⓘ NTSC signal Level
"F" DISPLAYED
"F" DISPLAYED
Ⓙ Pin 19 of IC1
"REC" DISPLAYED
"REC" DISPLAYED
Ⓚ Pin 17 of IC1
PAUSE
REC
PAUSE
REC
PAUSE
Ⓛ Collector of Q13
FADE IN
FADE OUT
Ⓜ VTR Recording (Video signal level)
Ⓝ Pin 7 of IC1

Fig. 4-12-3 Fade Control

5 Micro Processor Board (YFVKY3230P4A) (YFVPKA0714JA)

5-1 Micro Processor 53
5-2 Input Interface 58
5-3 Character Generator 58

5-1 Micro Processor

Outline

The micro processor IC2 generates the programmed key scan pulse signals from the output ports of IC2 and receives these signals at the input ports of IC2 through the input interface circuits.

According to the input signals, the micro processor IC2 supplies the instructional signals to the character generator IC1 and also transmits or receives serial data from/ to VTR for VTR remote control and displaying characters.

Serial data transmission

When the portable color video camera WV-4860 is used with the portable video cassette recorder PV-5000/ PV-6000, the serial data transmission system is performed between the both equipments through 10 pin VTR connector.

The signals which are exchanged between the two equipments through 10 pin connector is as shown in Fig. 5-1-1.

Pin	CAMERA	DIRECTION
1	Video OUT (REC) Video IN (P.B)	VTR ←→ CAMERA
2	GND for pin 1	VTR → CAMERA
3	Serial Data IN/OUT	VTR ←→ CAMERA
4	Serial Clock IN	VTR → CAMERA
5	STANDBY Ⓗ / AUDIO (CH2 (R)) OUT	VTR ← CAMERA
6	CAMERA PAUSE Ⓛ	VTR ← CAMERA
7	Audio (CH1 (L)) OUT	VTR ← CAMERA
8	GND for Audio	VTR → CAMERA
9	GND for pin 10	VTR → CAMERA
10	+12V	VTR → CAMERA

Fig. 5-1-1 10 pin Connector Signal

The serial clock signal is a reference signal which is used to control the timing of the data transmission between camera and VTR.

The serial clock signal is produced by VTR's micro processor and supplied to camera's micro processor IC2 as shown in Fig. 5-1-2.

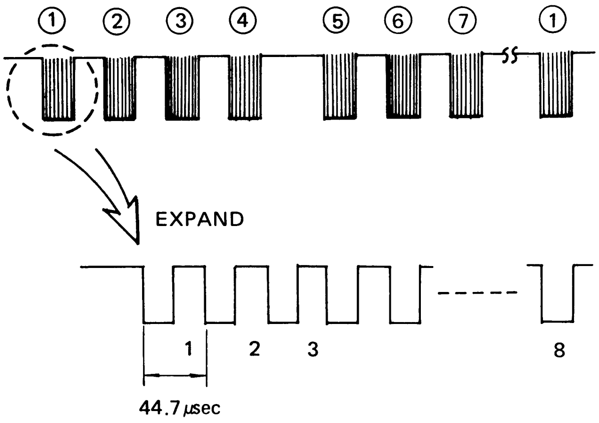


Fig. 5-1-2 Serial Clock

The serial clock signal has seven transmissions, and each transmission consists of 8 bit pulses.

During each transmission, the 8 bit serial data is exchanged as shown in Fig. 5-1-3.

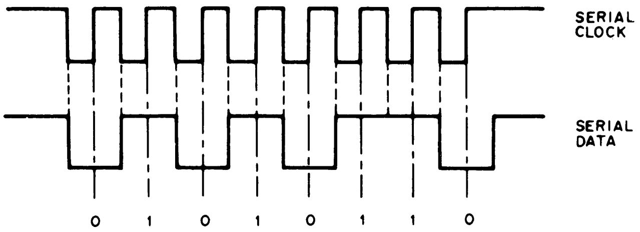


Fig. 5-1-3 Serial Data

The informations are converted into 8 bit logic data inside micro processor IC2. And for example, the coded data (Serial Data) is (0.1.0.1.0.1.1.0) and the timing chart between the serial data and the serial clock as shown in Fig. 5-1-3.

No.	DATA TRANSMISSION	
①	CAMERA → VTR	• MEMORY ON/OFF
②	TUNER → VTR	• REC/P.B SELECT
③	WIRED REMOTE CONTROLLER → VTR	• VTR P.B REMOTE CONTROL
④	INSIDE VTR	
⑤	VTR → CAMERA TUNER WIRED REMOCON	• BATTERY LEVEL • TAPE COUNTER
⑥	VTR → CAMERA	
⑦	VTR → CAMERA	

Fig. 5-1-4 Serial Data Transmission

The following serial data is supplied from the VTR to the camera during the transmission (5), (6) and (7) as;

. Battery level

. Tape counter display (Number, Memory : M)

The following serial data is supplied from the camera to the VTR during the transmission (1) as;

. Tape counter control (Reset, Memory ON/OFF)

. Remote control of playback (PLAY, SLOW, CUE, REVIEW, INS)

. REC/Playback selection signal

Details

The pin identifications and functions of the micro processor, IC2 is described in the Table 5-1.

IC2 MN1554 CVA

Pin Identifications

Pin No.	Name	IN/OUT	Descriptions
1	P12	OUT	F-VTR Display (F-VTR = L) F-VTR = Portable VTR with CAMERA SELECT Switch
2	P13	OUT	Tally Cancel Signal (F-VTR only)
3	SYNC	OUT	Not Used
4	SIRQ	IN	V.SYNC Input
5	IRQ	IN	Serial Clock (Inverted) Input
6	SBT	IN	Serial Clock Input
7	SBO	OUT	Serial Data Output
8	SBI	IN	Serial Data Input
9	RST	IN	Reset Pulse Input
10	P20	OUT	Key Scanning Pulse Output Data Output for DAO (20) of MN1237 (IC1)
11	P21	OUT	Key Scanning Pulse Output Data Output for DA1 (22) of MN1237 (IC1)
12	P22	OUT	Key Scanning Pulse Output Data Output for DA2 (23) of MN1237 (IC1)
13	P23	OUT	Key Scanning Pulse Output Data Output for DA3 (25) of MN1237 (IC1)
14	P30	OUT	Key Scanning Pulse Output Data Ouptut for DA4 (28) of MN1237 (IC1)
15	P31	OUT	Key Scanning Pulse Output Data Output for DA5 (29) of MN1237 (IC1)
16	P32	IN	Battery Warning-1 Input (CAMERA ITSELF)
17	P33	IN	Battery Warning-2 Input (CAMERA ITSELF)
18	P40	OUT	Automatic White Balance (B) 5 (LSB) INITIAL (H)
19	P41	OUT	Automatic White Balance (B) 4 (H)
20	P42	OUT	Automatic White Balance (B) 3 (L)
21	P43	OUT	Automaitc White Balance (B) 2 (L)
22	P50	OUT	Automatic White Balance (B) 1 (L)
23	P51	OUT	Automatic White Balance (B) 0 (MSB) (H)
24	P52	OUT	Playback DC Output (Playback = H)
25	VDD	IN	+5V DC Power Input
26	PC0	OUT	Battery Warning Output (Normal = L, NG = H, L, H, L)
27	PC1	OUT	Title Color Correction Output (Blue, Red = H, else = L)
28	P53	OUT	INT/EXT Title Select (INT = H, EXT = L)
29	P60	IN	Key Scanning Pulse Input
30	P61	IN	Key Scanning Pulse Input
31	P62	IN	Key Scanning Pulse Input
32	P63	IN	Key Scanning Pulse Input
33	P70	IN	Key Scanning Pulse Input
34	P71	IN	Key Scanning Pulse Input
35	P72	IN	Key Scanning Pulse Input
36	P73	IN	Key Scanning Pulse Input
37	P80	IN	Serial Clock (Tally Detect) Input
38	P81	IN	Camera Power ON/OFF Detect Input (ON = H, OFF = L)
39	P82	IN	Timer Count Pulse (60 Hz = V.pulse) Input
40	P83	IN	Standby Detect Input (ON = L, Standby = H)
41	P90	OUT	REC Timing Pulse Output
42	P92	OUT	FADE Timing Pulse Output
43	P92	OUT	REC RESET Pulse Output
44	P93	OUT	NEGA/POSI Select Output (NEGA =L, POSI = H)
45	PA0	OUT	Automatic White Balance (R) 5 (LSB) INITIAL (L)
46	PA1	OUT	Automatic White Balance (R) 4 (L)
47	PA2	OUT	Automatic White Balance (R) 3 (H)
48	PA3	OUT	Automatic White Balance (R) 2 (L)
49	PB0	OUT	Automatic White Balance (R) 1 (H)
50	PB1	OUT	Automatic Whtic Balance (R) 0 (MSB) (L)
51	PB2	OUT	REC START/PAUSE Control Output (Start = L for PANASONIC)
52	PB3	OUT	REC Display Output (REC = H, PAUSE = L)
53	OSC	OUT	Clock Pulse Generator
54	OSC	IN	Clock Pulse Generator or Clock Pulse Input
55	TCI	IN	H. SYNC or 32.768 KHz Pulse Input (Power ON = H. SYNC)
56	TC1	OUT	Timer Pulse Generator
57	Vss	---	Ground
58	P00	OUT	Timer Count Select Output (ON = L, STBY/Power OFF = H)
59	P01	OUT	Title Mask pulse Output (Title 1,2 only)
60	P02	OUT	V. SYNC Output
61	P03	OUT	Power Control Output (Power OFF = L, ON = H)
62	PC2	OUT	AWC Warning Output (OK = L, NG = Blink (0.4 sec), Setting = Blink (0.2 sec))
63	P10	OUT	ADM Output for MN1237 (IC1)
64	P11	OUT	LDI Output for MN1237 (IC1)

Table 5-1 Pin Identification of IC2 (Microprocessor)

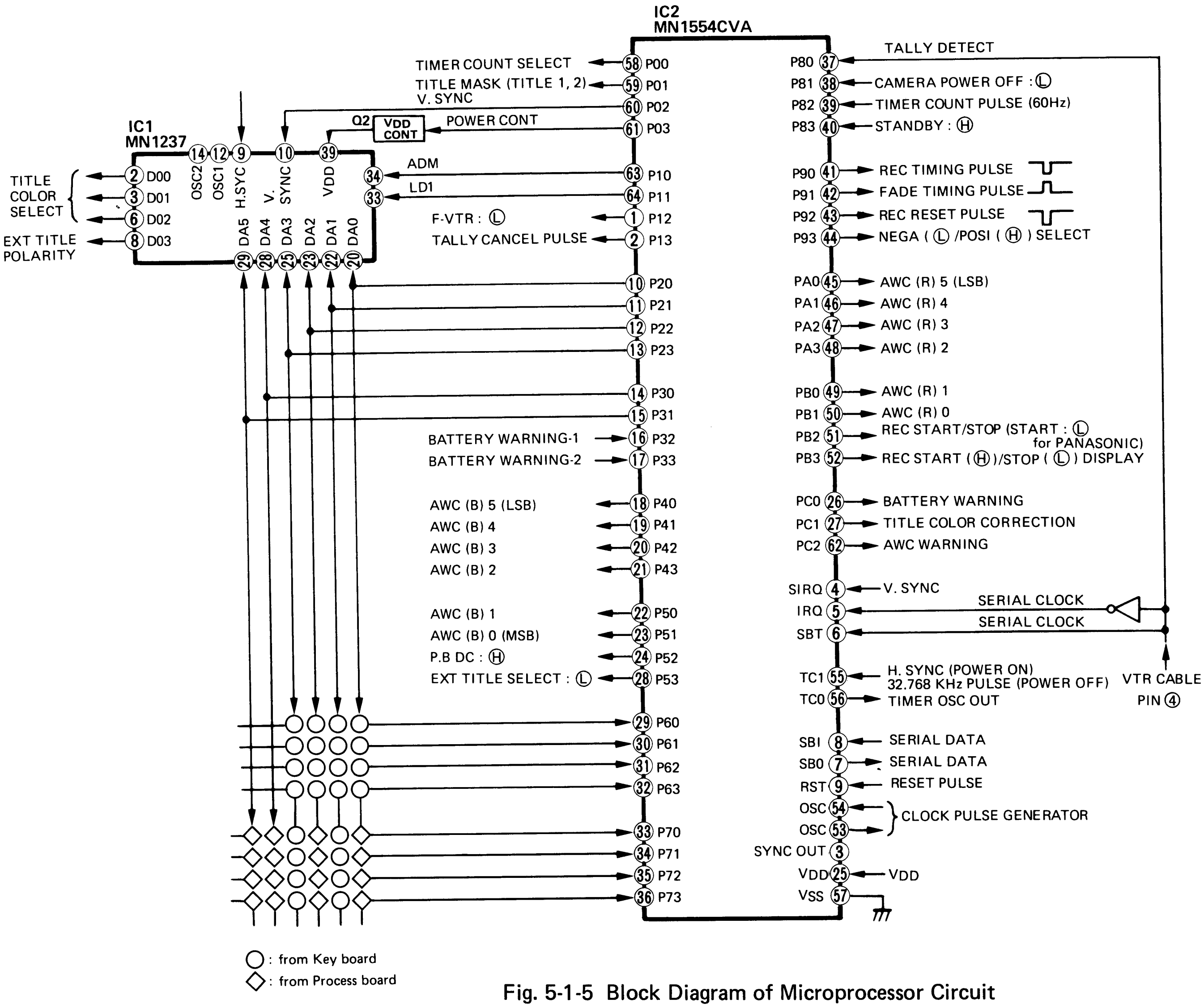

IC2
MN1554CVA
TIMER COUNT SELECT
TITLE MASK (TITLE 1, 2)
V. SYNC
Q2
VDD CONT
POWER CONT
ADM
LD1
F-VTR : Ⓛ
TALLY CANCEL PULSE
IC1
MN1237
TITLE COLOR SELECT
EXT TITLE POLARITY
D00
D01
D02
D03
OSC2
OSC1
H.SYC
H.SYNC
V.SYNC
VDD
DA5
DA4
DA3
DA2
DA1
DA0
P00
P01
P02
P03
P10
P11
P12
P13
P20
P21
P22
P23
P30
P31
BATTERY WARNING-1
BATTERY WARNING-2
P32
P33
AWC (B) 5 (LSB)
AWC (B) 4
AWC (B) 3
AWC (B) 2
P40
P41
P42
P43
AWC (B) 1
AWC (B) 0 (MSB)
P.B DC : Ⓗ
EXT TITLE SELECT : Ⓛ
P50
P51
P52
P53
P60
P61
P62
P63
P70
P71
P72
P73
TALLY DETECT
P80
P81
P82
P83
CAMERA POWER OFF : Ⓛ
TIMER COUNT PULSE (60Hz)
STANDBY : Ⓗ
P90
P91
P92
P93
REC TIMING PULSE
FADE TIMING PULSE
REC RESET PULSE
NEGA (Ⓛ /POSI (Ⓗ) SELECT
PA0
PA1
PA2
PA3
AWC (R) 5 (LSB)
AWC (R) 4
AWC (R) 3
AWC (R) 2
PB0
PB1
PB2
PB3
AWC (R) 1
AWC (R) 0
REC START/STOP (START : Ⓛ for PANASONIC)
REC START (Ⓗ)/STOP (Ⓛ) DISPLAY
PC0
PC1
PC2
BATTERY WARNING
TITLE COLOR CORRECTION
AWC WARNING
SIRQ
IRQ
SBT
V. SYNC
SERIAL CLOCK
SERIAL CLOCK
TC1
TC0
H. SYNC (POWER ON)
32.768 KHz PULSE (POWER OFF)
TIMER OSC OUT
VTR CABLE PIN④
SBI
SBO
RST
SERIAL DATA
SERIAL DATA
RESET PULSE
OSC
OSC
CLOCK PULSE GENERATOR
SYNC OUT
VDD
VSS
VDD
○ : from Key board
◇ : from Process board

Fig. 5-1-5 Block Diagram of Microprocessor Circuit

IC1 MN1237

Pin Identifications

Pin No.	Name	Description
1	VOB	Character Background Signal Output
2	DO0	Title Color Select-0 Out
3	DO1	Title Color Select-1 Out
6	DO2	Title Color Select-2 Out
8	DO3	Key Polarity Select Out
9	H. SYNC	H. SYNC Input
10	V. SYNC	V. SYNC Input
12	OSC 1	Clock Pulse Generator
14	OSC 2	
15	Vss	Ground
20	DA0	Data Input Bus-0
22	DA1	Data Input Bus-1
23	DA2	Data Input Bus-2
25	DA3	Data Input Bus-3
28	DA4	Data Input Bus-4
29	DA5	Data Input Bus-5
31	DA6	Data Input Bus-6
33	LDI	Strobe Pulse Input
34	ADM	Address Mode Select Input
35	TST	Test Input Concected to Ground
39	VDD	+5V Power Supply Input
41	VOW	Character Signal Output

Table 5-2 Pin Identification of IC1

IC2 Pin 16	IC2 Pin 17	DISPLAY
1	0	E – – – – F
1	1	E – – – F
0	1	E – – F
0	0	E – F

IC1 MN1237

TITLE COLOR SELECT

DOϕ	DO1	DO2	TITLE COLOR
0	0	0	WHT (White)
1	0	0	MGT (Magenta)
0	1	0	YLW (Yellow)
1	1	0	CYN (Cyan)
0	0	1	(CYN (Cyan))
1	0	1	BLU (Blue)
0	1	1	GRN (Green)
1	1	1	RED (Red)

DO3 (KEY POLARITY OUT (EXT NEGA))
NORMAL : H
REVERSE : L

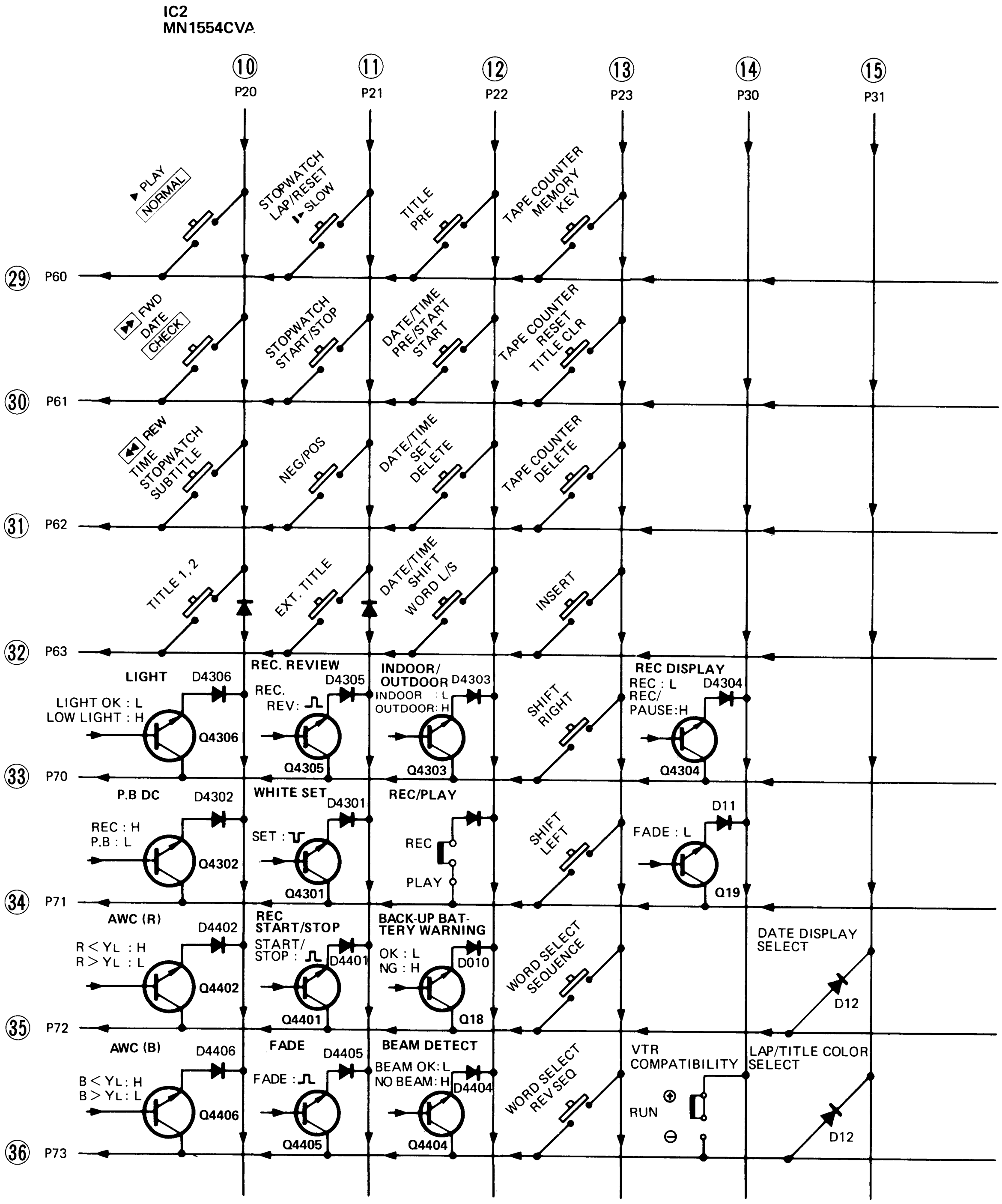

IC2
MN1554CVA
⑩ P20
⑪ P21
⑫ P22
⑬ P23
⑭ P30
⑮ P31
㉙ P60
㉚ P61
㉛ P62
㉜ P63
㉝ P70
㉞ P71
㉟ P72
㊱ P73
▶ PLAY NORMAL
STOPWATCH LAP/RESET I▶ SLOW
TITLE PRE
TAPE COUNTER MEMORY KEY
▶▶ FWD DATE CHECK
STOPWATCH START/STOP
DATE/TIME PRE/START START
TAPE COUNTER RESET TITLE CLR
◀◀ REW TIME STOPWATCH SUBTITLE
NEG/POS
DATE/TIME SET DELETE
TAPE COUNTER DELETE
TITLE 1, 2
EXT. TITLE
DATE/TIME SHIFT WORD L/S
INSERT
LIGHT
D4306
LIGHT OK : L
LOW LIGHT : H
Q4306
REC. REVIEW
D4305
REC.
REV: ⎍
Q4305
INDOOR/ OUTDOOR
D4303
INDOOR : L
OUTDOOR: H
Q4303
SHIFT RIGHT
REC DISPLAY
REC : L
D4304
REC/ PAUSE:H
Q4304
P.B DC
D4302
REC : H
P.B : L
Q4302
WHITE SET
D4301
SET : ⊔
Q4301
REC/PLAY
REC
PLAY
SHIFT LEFT
D11
FADE : L
Q19
AWC (R)
D4402
R < YL : H
R > YL : L
Q4402
REC START/STOP
START/ STOP : ⎍
D4401
Q4401
BACK-UP BATTERY WARNING
OK : L
NG : H
D010
Q18
WORD SELECT SEQUENCE
DATE DISPLAY SELECT
D12
AWC (B)
D4406
B < YL: H
B > YL: L
Q4406
FADE
D4405
FADE : ⎍
Q4405
BEAM DETECT
BEAM OK: L
NO BEAM: H
D4404
Q4404
WORD SELECT REV SEQ
VTR COMPATIBILITY
RUN
⊕
⊖
LAP/TITLE COLOR SELECT
D12

Fig. 5-1-6 Input Matrix Circuit

The programmed signals (key scan pulse) are supplied from output ports P20, P21, P22, P23, P30 and P31 to input interface circuits.

Then, these programmed signals are supplied from input interface circuits to input port P60, P61, P62, P63, P70, P71, P72 and P73 switches and transistors. (Refer to 5-2, Input Interface)

According to the programmed signals at input port P60, P61, P62, P63, P70, P71, P72 and P73, and the signal at input port P32 and P33, the micro processor identifies the instruction with the signal flow route at input interface circuit and supplies the instructional signals (P20 - P23, P30 - P31) to character generator, IC1.

The serial clock pulse is supplied from VTR to pin 5 (IRQ) and pin 6 (SBT) of IC2 to match the timing for data transmitting and receiving to/from VTR.

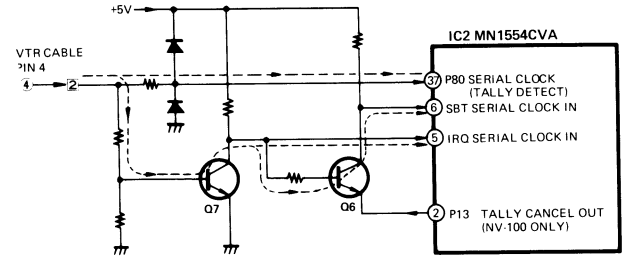

+5V
VTR CABLE
PIN 4
4
2
IC2 MN1554CVA
37 P80 SERIAL CLOCK
(TALLY DETECT)
6 SBT SERIAL CLOCK IN
5 IRQ SERIAL CLOCK IN
2 P13 TALLY CANCEL OUT
(NV-100 ONLY)
Q7
Q6

Fig. 5-1-7 Serial Clock Circuit

The serial data is fed from VTR to pin 8 (SBI) of IC2 so that the micro processor identifies the instruction from VTR. Also the serial data is sent from pin 7 (SBO) of IC2 to VTR through serial data transmission controller Q103 and inverter Q8. (Fig. 5-1-5)

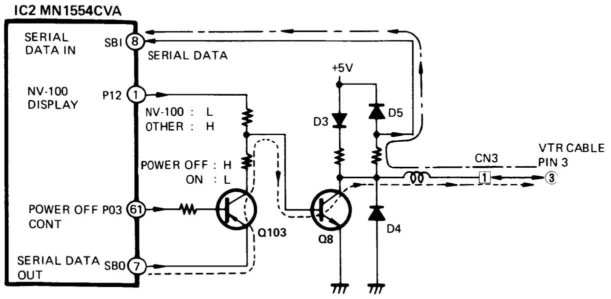

IC2 MN1554CVA
SERIAL DATA IN
SBI 8
SERIAL DATA
NV-100 DISPLAY
P12 1
NV-100 : L
OTHER : H
+5V
D3
D5
POWER OFF : H
ON : L
CN3
VTR CABLE PIN 3
1
3
POWER OFF CONT
P03 61
Q103
Q8
D4
SERIAL DATA OUT
SBO 7

Fig. 5-1-8 Serial Data Circuit

The 60 Hz clock pulse (Timer Count Pulse) generated by the wide blanking (W.BL) pulse at process board for the stopwatch function is supplied to pin39 (P82) of IC2 during recording mode.

The V. sync pulse is fed from sync separation circuit on the Deflection board to pin 4 (SIRQ) of IC2 to control the vertical timing.

The character select circuit is shown in Fig. 5-1-6. When the either title-1 or title-2 characters are displayed on EVF screen, the character select circuit is functioned. Because the character select circuit in IC5 on Deflection board makes separation depend on the vertical location of character signals. Therefore, the upper half of either title-1 or title-2 character is only displayed in the EVF and lower half of that can be recorded and also displayed in the EVF.

The character select circuit is functioned so that the title-1 and 2 can be recorded to VTR.

The title mask signal is supplied from pin 59 (P01) to the both bases of Q1 and Q5 as shown in fig.

During the title mask pulse is high period, the character signal from pin 41 of IC1 is fed to IC5 on Deflection board through Q1.

During the title mask pulse is low period, the character signal is sent to IC8 on Process board through Q3 and Q4.

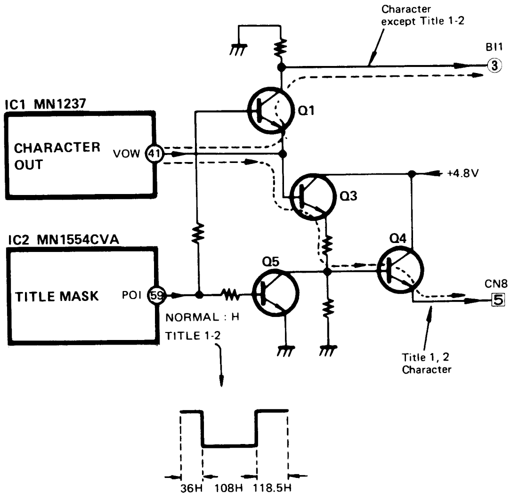

Character except Title 1-2
BI1
3
IC1 MN1237
CHARACTER OUT
VOW 41
Q1
+4.8V
Q3
IC2 MN1554CVA
Q4
Q5
TITLE MASK
POI 59
NORMAL : H
TITLE 1-2
CN8
5
Title 1, 2 Character
36H
108H
118.5H

Fig. 5-1-9 Character Select Circuit

The REC Reset (fade reset) signal is sent from pin 43 (P92) of IC2 to rec control circuit on Process board so that fader mode is reset when the camera is set to fade-in/out mode.

The REC Timing signal is fed from pin 41 (P90) of IC2 to rec control circuit on process board to protect the misoperation of the fade-in/out mode by the noise of electrostatics by controlling the fade-in/out timing. The FADE Timing signal is also supplied from pin 42 (P91) of IC2 to rec control circuit on process board for the same reason and purpose.

The NEGA/POSI control signal is applied from pin 44 (P93) of IC2 to video signal processing circuit on process board so that the normal(positive) picture is appeared when camera is aimed to negative color film.

Camera power detect circuit consisting of Q102 and Q9 detects whether the camera power is supplied or not and sends the information to pin 38 of IC2.

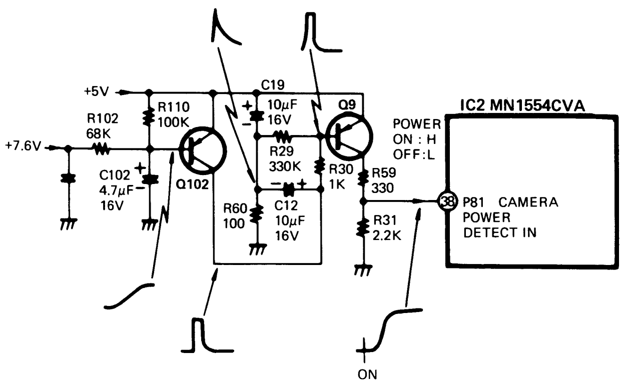


Fig. 5-1-10 Power Detect Circuit

Then, IC2 sends out the power control signal from pin 61 of IC2 to both base of Q1 and Q2.

When the camera is operated normally, Q1 and Q2 are turned ON so that +5V DC is supplied to other circuit.

When the camera power is cut off, Q1 and Q2 are turned OFF so that +5V DC is not supplied to other circuit except IC2 in order for longer battery life.

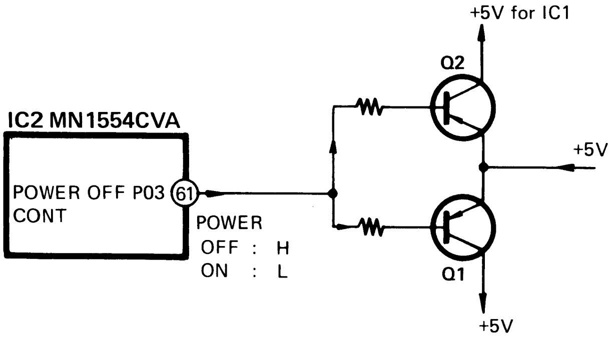


Fig. 5-1-11 Power Control Circuit

5-2 Input Interface Circuit

The input interface circuits consist of the three blocks as;

. EVF Display Board Circuit

. Camera Conditions Sensor Circuit

and these are constructed in the matrix circuit.

The output ports and input ports of the micro processor is incorporated with the matrix circuit.

The programmed signals (key scan pulses) are supplied from the output ports P20 - P23, P30 - P31 to the matrix circuit so that the programmed signals are returned to the input ports P60 - P63, P70 - P73 through diodes/switches, in the matrix circuit.

The micro processor, IC2 will know the function of the camera by detecting the returned programmed signal. According to the signals at the input ports of the micro processor, IC2, the micro processor supplies the graphics instructions to the character generator, IC1 and the remote control instructions to VTR.

5-3 Character Generator

The clock pulse frequency of IC1 is adjusted by VR1 (CHARACTER SIZE).

The display characters are separated into the two categories as;

(1) A : Cannot be recorded and only display on the EVF.

(2) B : Can be recorded and supplied to VTR recorder except title-1 & 2.

(3) C : Title-1 & 2 (can be recorded)

The character (A + B) at pin 41 (VOW) of IC1 is supplied through Q1 to pin 16 of IC5 on the deflection board.

The character (A + B) is separated into the graphics (A) and graphics (B) inside IC5 on the deflection board. The graphics (B) is fed from pin 14 of IC5 on deflection board to process board and mixed with the video signal inside IC8 on the process board. Then NTSC signal (video + C + B) is supplied from pin 13 of IC8 to VTR through pin 1 of CN101 VTR cable. Also NTSC signal (EVF video + C + B) is supplied from pin 13 of IC8 through the trap (CF6) and pin 18 of IC5 on the deflection board.

The signal (EVF video + C + B) is mixed with the graphics (A) inside IC5 on the deflection board so that the signal (EVF video + C + B + A) is supplied from pin 24 of IC5 to viewfinder.

6. Audio/Lens Control Board (YFVKY3230P5A)

6-1. AIC amplifier

Outline

The AIC amplifier receives AIC detect signal from process board and drives lens iris in order to keep video output level constant.

Details

AIC amplifier consists of IC1(a) and IC1(b).

The AIC detect signal is supplied from signal processing circuit on process board to pin 6 (--) of IC1 and amplified by IC1(b). Then it is sent from pin 1 of IC1 to drive coil of lens iris in order to open/close lens iris. In addition to this, the beam detect signal from deflection board is fed to pin 6 of IC1 in order to close the lens iris during the beam current is insufficient.

The induced voltage (it is occurred by moving lens iris inside the damper coil.) is fed from lens damper coil to pin 3 (+) of IC1 and amplified by IC1(a). Then amplified signal is fed from pin 1 of IC1 to pin 6 of IC1 to damp the lens iris hunting.

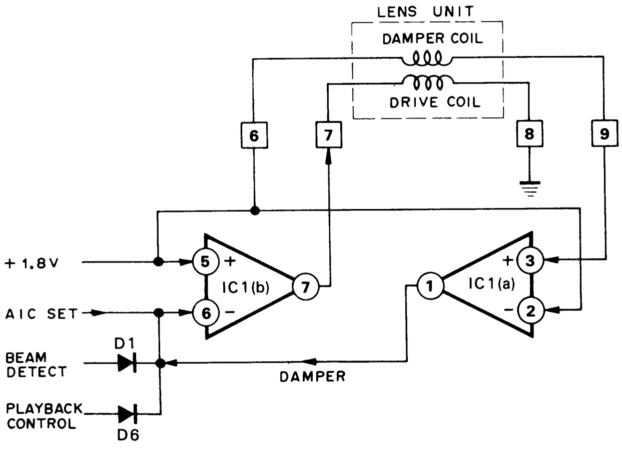

LENS UNIT
DAMPER COIL
DRIVE COIL
6
7
8
9
+1.8V
AIC SET
BEAM DETECT
PLAYBACK CONTROL
D1
D6
5 +
6 -
IC1(b)
7
+ 3
- 2
IC1(a)
1
DAMPER

Fig. 6-1 AIC Amplifier Circuit

6-2. Zoom Control Circuit

Outline

This circuit drives zoom lens motor.

Details

When the TELE switch SW1 on the handle grip is depressed, the base of Q4 shorted to the ground and turn ON Q4 and Q1. Therefore, the current flows into the zoom motor through Q1 and Q4 for zoom-in (telephoto) operation.

When the WIDE switch SW2 is depressed, Q2 and Q3 turn ON. Therefore, the current flows into the zoom motor (in the reverse direction) through Q3 and Q2 for zoom-out (wide angle) operation.

SW2 on the FADE/AGC SWITCH board is a zoom speed switch to set the zoom speed by changing the DC voltage at the both bases of Q2 and Q4.

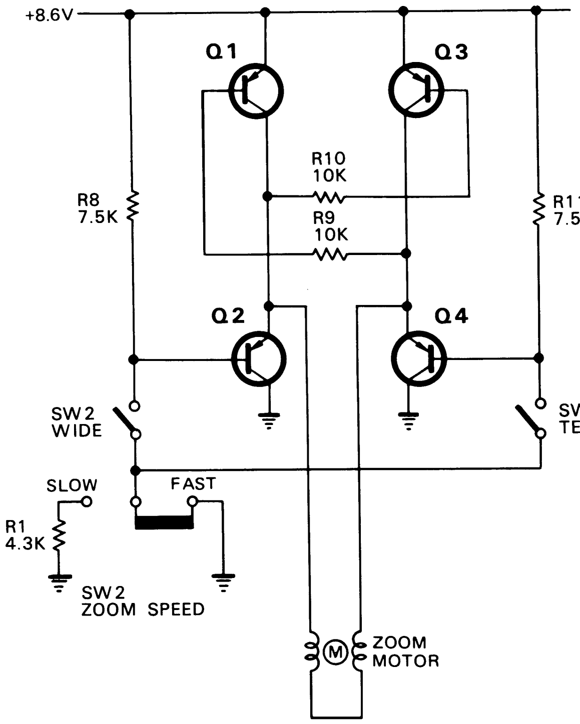

+8.6V
Q1
Q3
R10
10K
R9
10K
R8
7.5K
R11
7.5K
Q2
Q4
SW2
WIDE
SW1
TELE
SLOW
FAST
R1
4.3K
SW2
ZOOM SPEED
M
ZOOM
MOTOR

Fig. 6-2 Zoom Control Circuit

6-3 Audio Amplifier Circuit

Outline

This circuit amplifies the output from the mounted microphone or external microphones.

The amplified audio signal is sends out to the VTR for recording and to the earphone jack on the rear of the camera for audio monitoring.

Details

The -72dB output for channel-1 (left) or channel-2 (right) from the electret condenser microphone (which is mounted on the camera), or one/two external microphone(s) is/are supplied to audio amplifier consisting of Q6, Q7, IC2 and IC3 respectively where it/they is/are amplified +52dB.

The -20dB audio output at pins 1 (CH1) & 7 (CH2) of IC2 are sent directly to the portable VTR or via power supply to the table model VTR through terminal No. 3 (CH1) & 2 (CH2) of CN7 and terminal No. 7 (CH1) & 5 (CH2) of VTR connector CN101, and earphone jack JK1 through terminal No. 3 (CH1) & 2 (CH2) of CN8.

The amplified audio signal at pin 1 (CH1) & 7 (CH2) of IC3 are also fed to D4 (CH1) & D7 (CH2) where it is converted into DC voltages.

The rectified DC voltages are supplied to the base of Q6 (CH1) & Q7 (CH2) to control the resistance between the collector and emitter of Q6 & Q7.

When the audio signal level at pin 1 (CH1) & 7 (CH2) of IC3 increases, the DC voltage at the base of Q6 (CH1) & Q7 (CH2) also increases and resistance between collector and emitter decreases. Therefore, the audio signal level at pin 3 (CH1) & 5 (CH2) of IC3 decreases.

When the audio signal level at pin 1 (CH1) & 7 (CH2) of IC3 decreases, the reverse operation takes place.

In this way, the audio signal output level is kept constant.

The audio signal level is also controlled by the fade control signal supplied from Process board through Q5.

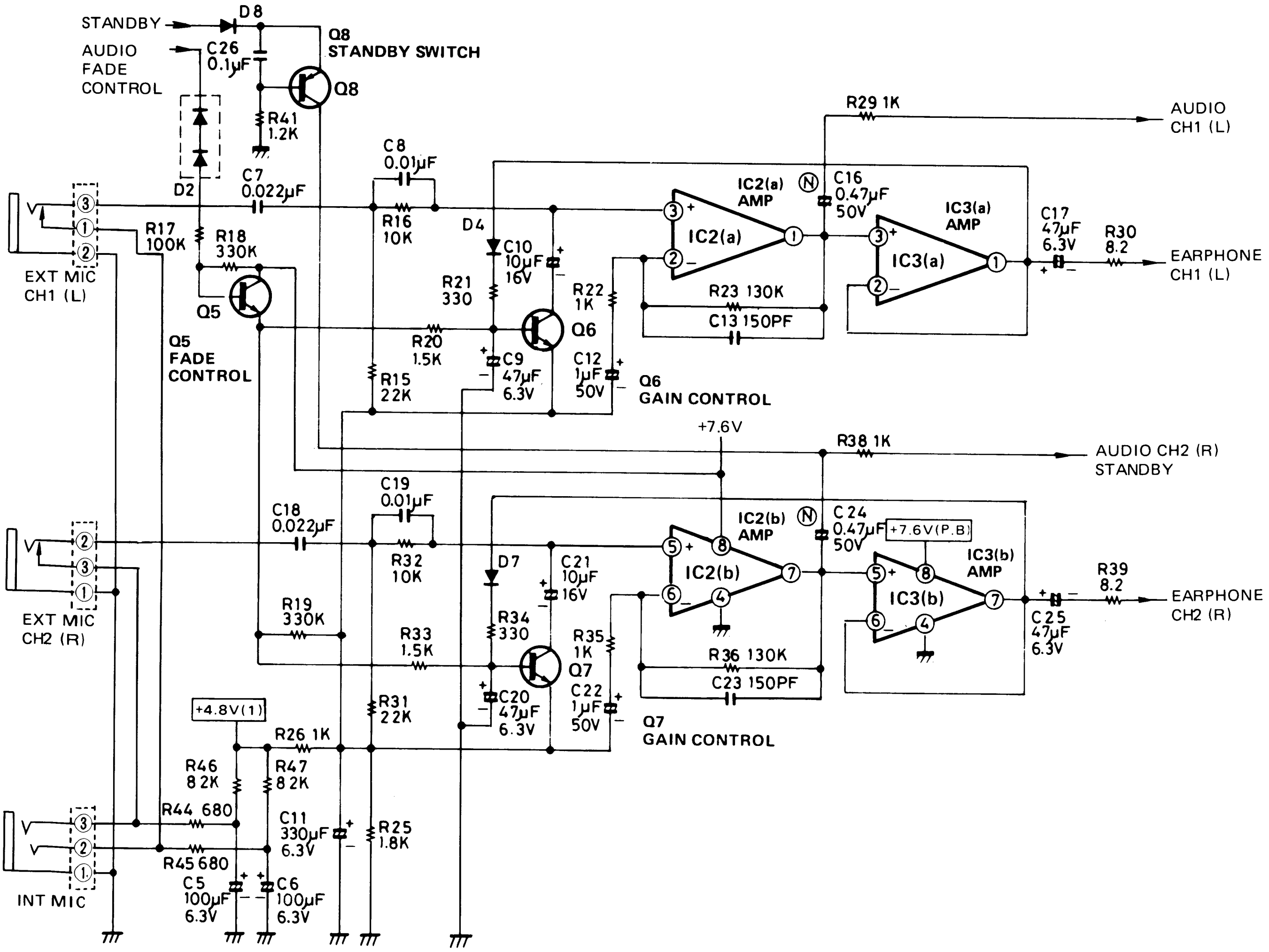

STANDBY
D8
AUDIO FADE CONTROL
C26 0.1μF
Q8 STANDBY SWITCH
Q8
R41 1.2K
D2
C7 0.022μF
EXT MIC CH1 (L)
R17 100K
R18 330K
Q5
Q5 FADE CONTROL
C8 0.01μF
R16 10K
D4
C10 10μF 16V
R21 330
R20 1.5K
R15 22K
C9 47μF 6.3V
R22 1K
Q6
C12 1μF 50V
Q6 GAIN CONTROL
IC2(a) AMP
IC2(a)
C16 0.47μF 50V
R23 130K
C13 150PF
IC3(a) AMP
IC3(a)
R29 1K
AUDIO CH1 (L)
C17 47μF 6.3V
R30 8.2
EARPHONE CH1 (L)
+7.6V
R38 1K
AUDIO CH2 (R) STANDBY
EXT MIC CH2 (R)
C18 0.022μF
C19 0.01μF
R32 10K
R19 330K
R33 1.5K
D7
C21 10μF 16V
R34 330
R35 1K
Q7
C20 47μF 6.3V
C22 1μF 50V
R31 22K
Q7 GAIN CONTROL
IC2(b) AMP
IC2(b)
C24 0.47μF 50V
+7.6V(P.B)
IC3(b) AMP
IC3(b)
R36 130K
C23 150PF
R39 8.2
C25 47μF 6.3V
EARPHONE CH2 (R)
+4.8V(1)
R26 1K
R46 82K
R47 82K
R44 680
R45 680
C11 330μF 6.3V
R25 1.8K
C5 100μF 6.3V
C6 100μF 6.3V
INT MIC

Fig. 6-3 Audio Amplifier Circuit

7 Auto Focus Board (YFES950-43A), (YFES950-43B), (YFES950-43C)

7-1. General 61
7-2. Ultrasonic Transmission Circuit 62
7-3. Ultrasonic Echo-Reception Circuit 63
  7-3-1. Echo-Reception Circuit 63
  7-3-2. Variable Reference Voltage Circuit . . . 64
7-4. Motor Driving Circuit 65
  7-4-1. Data Process in IC001 for Motor Driving Circuit 65
  7-4-2. Lens Position Sensor 65
  7-4-3. Motor Driving Circuit 66
7-5. Supporting Circuit 67
  7-5-1. Regulators/Power Supply 67
  7-5-2. Thermal Correction Circuit 67
  7-5-3. Interface Circuit 67

7-1 General

This Auto Focus system is utilizing a ultrasonic to measure the time between the objects and camera and controls the lens focus automatically.

The time represents the distance between the camera/ lens and object.

All functions of this Auto Focus system are controlled by the MPU (Micro Processor Unit).

The system primary consists of the four blocks as;

(1) Ultrasonic Transmission Circuit
(2) Ultrasonic Echo-Reception Circuit
(3) Lens Motor Driving Circuit
(4) Supporting Circuits

The functional block diagram of the Auto Focus system is shown in Fig. 7-1-1.

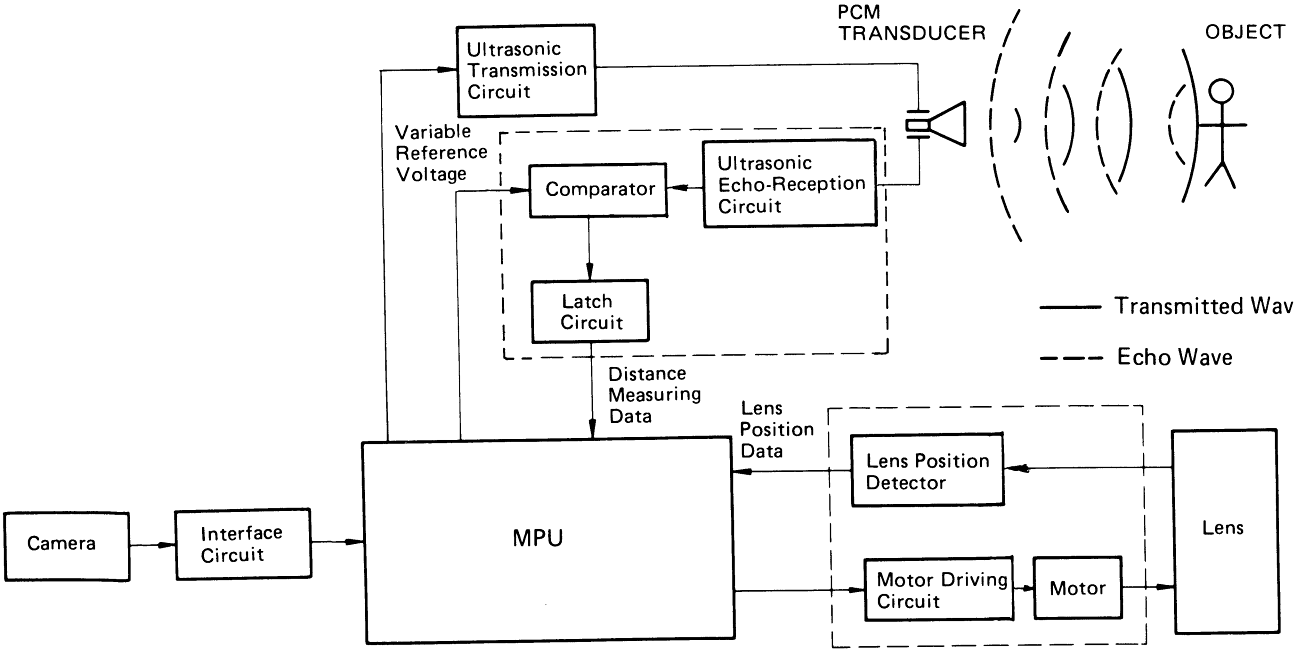
The transmission circuit transmits the 63.8KHz pulsed ultrasonic from the PCM (Piezo Ceramic Material) transducer when the timing pulse is provided from IC001.

The ultrasonic echo-reception circuit receives the echo from the objects at the transducer and amplifies the echo signal for the comparison with the variable reference voltage.

The echo level at the transducer is almost in inverse proportion to the distance/time so that the echo level from the near object is stronger and for the far object is weaker if the ultrasonic echo level is compared with the specified reference voltage.

This means that the sensitivity for the near object is overleveled and for the far object is not enough for the echo-reception circuit.

This Auto Focus system is primary designed to response human being so that the echo level from human being is varied according to the distance and is set to be higher than the reference voltage which is varied per echo distance/time to the object as shown in Fig. 7-1-2.



PCM TRANSDUCER
OBJECT
Ultrasonic Transmission Circuit
Variable Reference Voltage
Comparator
Ultrasonic Echo-Reception Circuit
Latch Circuit
Distance Measuring Data
Lens Position Data
Lens Position Detector
Lens
Camera
Interface Circuit
MPU
Motor Driving Circuit
Motor
Transmitted Wave
Echo Wave

Fig. 7-1-1 Functional Block Diagram of Auto Focus System

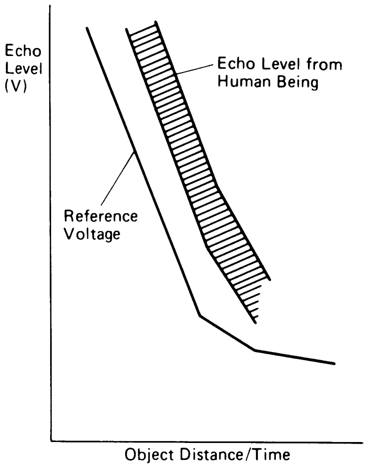


Fig. 7-1-2 Echo Level and Reference Voltage

The echo level and the variable reference voltage is compared by the comparator.

The output of the comparator is supplied to IC001 after the output is holding by the latch circuit.

IC001 measures the time which the ultrasonic is transmitted and received from/on the transducer, and calculates the distance between the camera and the object based on the wave speed of the ultrasonic.

IC001 detects the lens focus position and instructs the motor driving circuit to activate the motor for turning focus ring to the desired position.

7-2 Ultrasonic Transmission Circuit

Outline

This circuit generates the ultrasonic and transmits the ultrasonic from the transducer.

Details

The clock pulse for IC001 is generated by 400KHz ceramic oscillator circuit consisting of X002, R034, C016 and C017.

Vs pulse is supplied from the camera unit through pin 10 of lens connector CN107 and Q23 to pin 25 of IC001. The 540 μs timing pulse is then generated at pin 11 of IC001 during the vertical blanking period.

The 2.4 ms pulse at pin 13 of IC001 is supplied to IC004(e) and IC004(f) thrugh Q009 and Q010 and the ultrasonic is generated during the 2.4 ms pulse period by the 63.8KHz oscillator circuit consisting of IC004(d), IC004(e) and IC004(f) as shown in Fig. 7-2-1.

The frequency of generated ultrasonic is adjusted by VR003 (63.8KHz ADJ) to 63.8KHz.

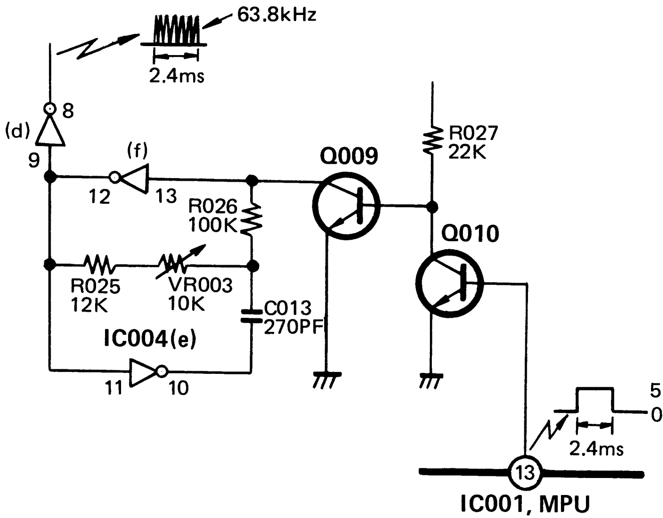


Fig. 7-2-1 Ultrasonic Generator

The ultrasonic Transmission circuit is shown in Fig. 7-2-2.

To reduce the pulsed audio noise from generating the ultrasonic, the trapezoid pulsed ultrasonic is transmitted. The 540 μs timing pulse at pin 11 of IC001 is supplied to the base of Q011.

The pulse at the collector of Q011 is integrated by R006 and C006 to make trapezoid at the collector of Q001. The trapezoid pulse is rounded its corner by R008 and C007 and amplified by Q002 and Q003.

The pulsed ultrasonic at pin 8 of IC004 is provided to Q004 through buffer Q005. Q004 is switching ON and OFF by the pulsed ultrasonic and the pulsed ultrasonic is built up during trapezoid period at the primary of T001.

The amplitude of the trapezoid pulsed ultrasonic at the secondary of T001 is approx. 100Vp-p which is transmitted from the PCM transducer through D001 and D002.

D001 and D002 cut the level less than ±0.7V so that the induced noise of T001 is cut for improving the noise figure of the echo reception circuit during receiving period.

When the trapezoid pulsed ultrasonic is transmitted, the current approx. 1 - 2 amperes is passed through T001 and creates the noises which are not observed, because the trapezoid pulsed ultrasonic is transmitted during the vertical blanking period.

To prevent the effects on the other circuits, the separate regulated power supplies are used.

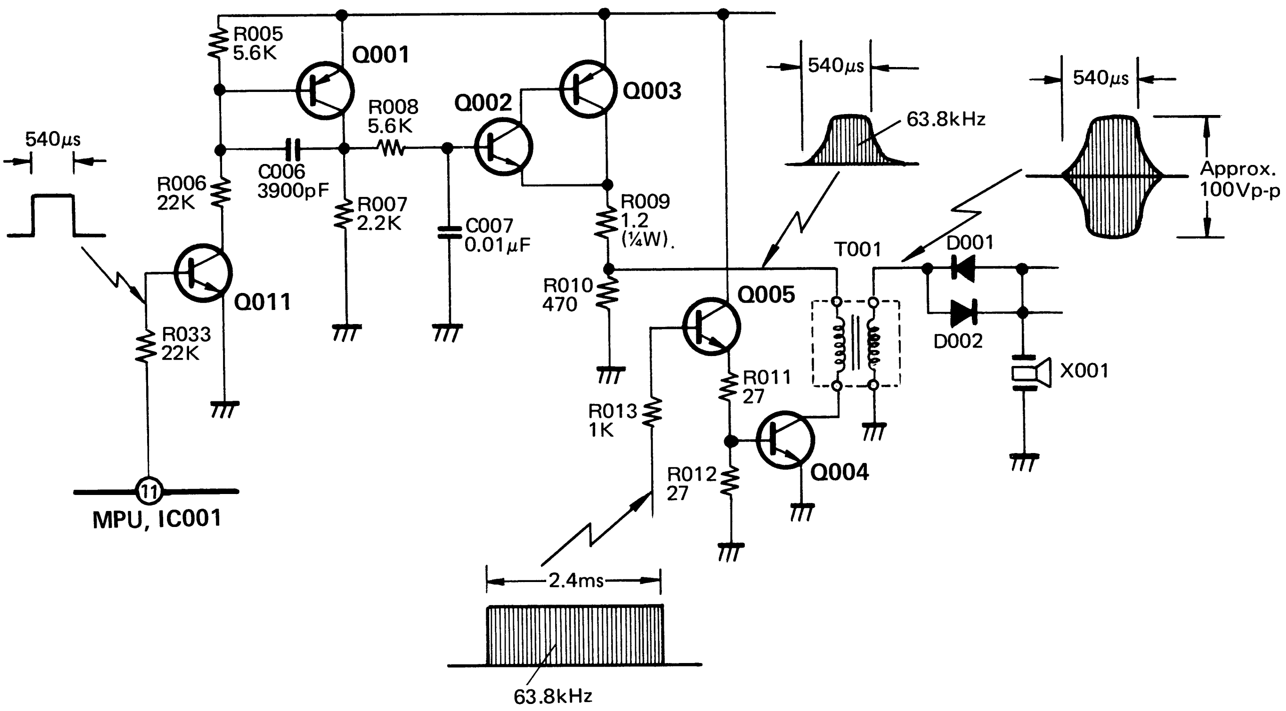

R005
5.6K
Q001
R008
5.6K
Q002
Q003
540μs
R006
22K
C006
3900pF
R007
2.2K
C007
0.01μF
R009
1.2
(¼W).
R010
470
Q011
R033
22K
Q005
540μs
63.8kHz
540μs
Approx.
100Vp-p
T001
D001
D002
X001
R011
27
R013
1K
R012
27
Q004
11
MPU, IC001
2.4ms
63.8kHz

Fig. 7-2-2 Ultrasonic Transmission

7-3 Ultrasonic Echo-Reception Circuit

Outline

This circuit receives the echo at transducer and it is sent to IC001 after comparing with the reference voltage and IC001 calculates the time/distance between the lens/camera and the object.

Details

7-3-1 Echo-Reception Circuit

The echo is received at transducer after several msec from the transmission and the echo level is in inverse proportion to the distance from the lens/camera and the object.

Due to the very low echo level at the transducer, the gain of the echo-reception circuit is approx. 100dB and the echo-reception circuit is shown in Fig. 7-3-1.

R001 and C001 are for matching impedance with T001.

D003 and D004 cut off the level more than ±0.7V for preventing excessive input at the pin 2 of operational amplifier IC002 during transmission period.

The echo at the transducer is supplied to pin 2 of IC002 and is amplified by IC002 and Q006. The amplifier gain of the echo-reception circuit is adjusted by VR001 (GAIN).

L002 is the resonance 63.8KHz band pass filter for improving the signal to noise ratios at 63.8KHz.

The comparator, the reference voltage and the latch circuit are shown in Fig. 7-3-2.

D008, 5V zener prevents the excessive input to be supplied to comparator IC003.

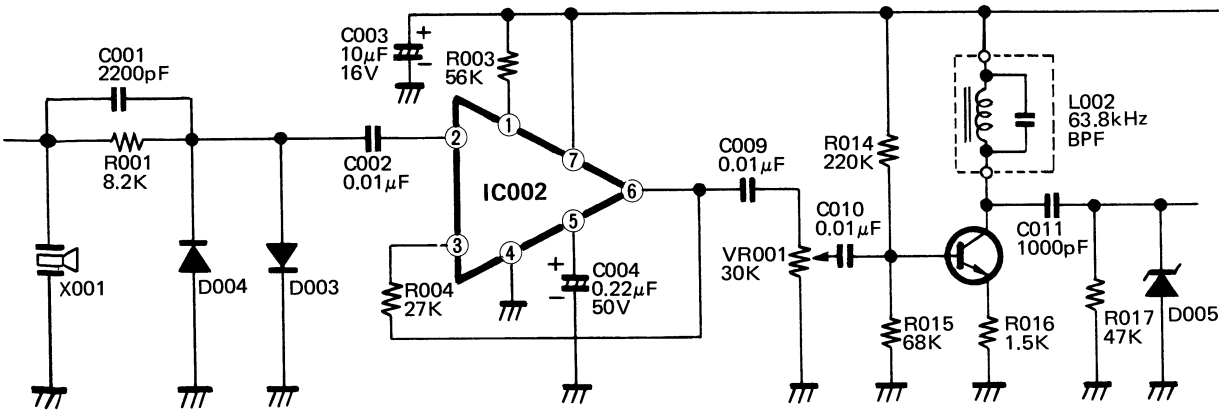

C001
2200pF
C003
10μF
16V
R003
56K
R001
8.2K
C002
0.01μF
1
2
3
4
5
6
7
IC002
C009
0.01μF
R014
220K
L002
63.8kHz
BPF
C010
0.01μF
C011
1000pF
VR001
30K
X001
D004
D003
R004
27K
C004
0.22μF
50V
R015
68K
R016
1.5K
R017
47K
D005

Fig. 7-3-1 Ultrasonic Echo Reception Circuit

The output is provided at pin 7 of IC003 when the echo level at pin 5 of IC003 becomes higher than the variable reference voltage at pin 6.

The received echo is supplied to pin 3 of IC003(a) and the variable reference voltage is supplied to pin 2 of IC003(a). The compared information is detected to pin 1 of IC003(a).

The compared information is holded by latch circuit consisting of IC004(b) and IC004(c).

The hold level of the latch is supplied to pin 21 of IC001.

IC001 calculates the time period/distance between the starting time of 540 μs transmitting timing pulse and the starting time of the holding echo at the anode of D008. This time period represents the distance of the object from the lens/camera.

7-3-2 Variable Reference Voltage Circuit

Q008 is ON during the 2.4 ms pulse width at the base of Q008, and also Q007 is ON. The variable reference voltage is determined by the time constant consisting of R21, R22, TH001, C012 and VR002 and is adjusted by VR002.

The variable reference voltage is designed to set the approx. 10dB lower than the human being echo signal for the optimum emission angle and effective distance (see Fig. 7-1-2 in page 62).

The timing chart for the transmission and the echo-reception is shown in Fig. 7-3-3.

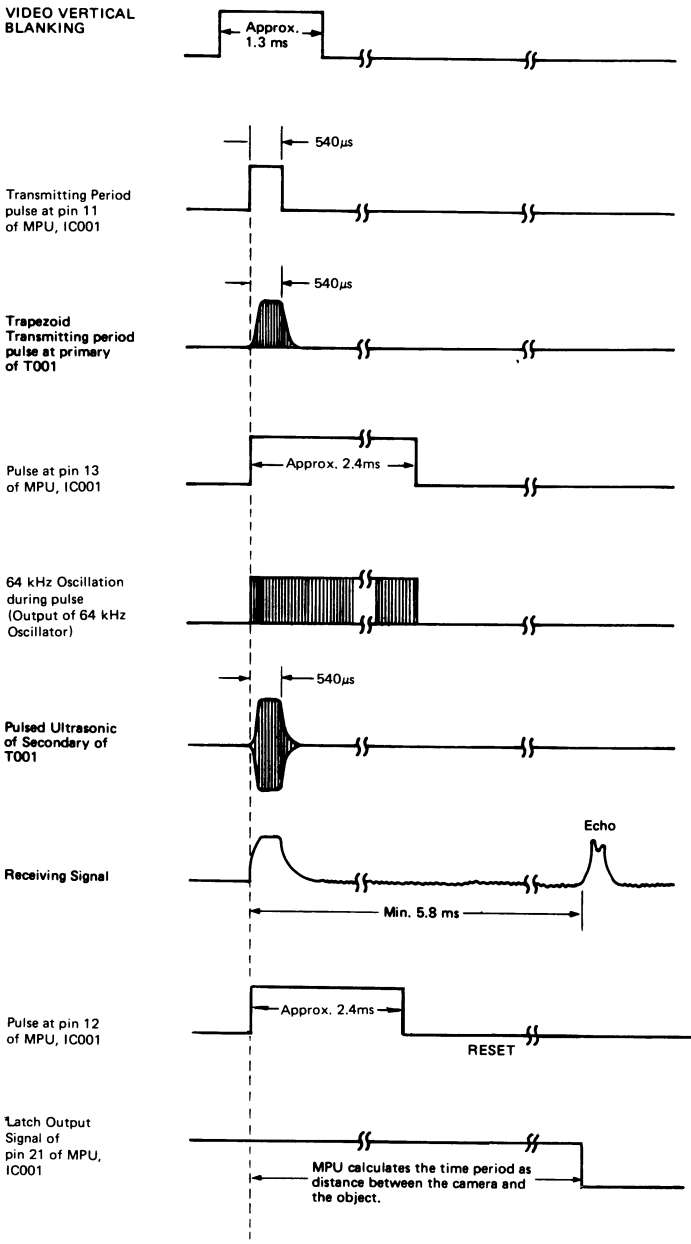


Fig. 7-3-3 Timing chart for Measuring Time/Distance

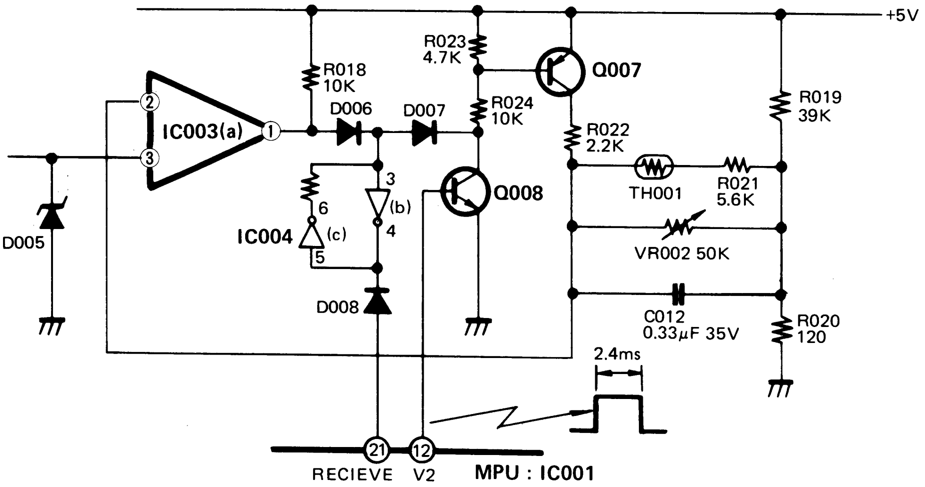

+5V
R023 4.7K
R018 10K
Q007
R019 39K
IC003(a)
2
3
1
D006
D007
R024 10K
R022 2.2K
TH001
R021 5.6K
Q008
3
(b)
4
6
IC004
(c)
5
VR002 50K
D005
D008
C012 0.33μF 35V
R020 120
2.4ms
21
12
RECIEVE
V2
MPU : IC001

Fig. 7-3-2 Comparator Reference Voltage and Latch Circuits

7-4 Motor Driving Circuit

Outline

This circuit detects the position of the lens motor/current lens position of the focus ring and provides the informations to IC001.

IC001 processes the informations of the echo signals and the lens positions, and activates the lens motor driving circuit to rotate the focus ring for the desired position.

Details

7-4-1 Data Process in IC001 for Motor Driving Circuit

Considering the external disturbances such as a metallic noise, telephone bell and clock bell etc, or the camera operations under bad conditions, the auto focus might be misoperationed whenever the auto focus is responded for each echo signal.

To avoid the misoperation, IC001 has the 7 registers for storing 7 distance-data.

When the 8th data is input into IC001, the 1st stored register data is shifted off.

IC001 always stores 7 data in the 7 registers as shown in Fig. 7-4-1.

IC001 checks the 7 data and neglects the data which is excessively different from other levels.

The similar data is shown with the asterisk mark in Fig. 7-4-1, for example.

IC001 makes the average of four data, 15, 14, 15 and 16 in the 1st status as 15 and activates the focus motor to be 15 lens point.

When the new echo/data is input as 12 lens point, IC001 makes the average of four data, 12, 15, 14 and 15 in the 2nd status as 14 lens point and activates the focus motor to be 14 lens point.

In this way, the misoperation is avoided and the auto focusing is not responded when the external disturbances occur or something is rapidly crossed in front of the camera/lens.

When the camera is aimed at the fixed object, the 7 distance data may be same. When more than 3 data of 7 are the same, the transmission interval becomes 0.3 sec by force to save the power consumptions.

7-4-2 Lens Position Sensor

This sensor detects the current position of the lens focus ring which has the gray codes pattern with 7 brush contacts around the focus ring.

The part of the gray codes pattern is shown in Fig. 7-4-2.

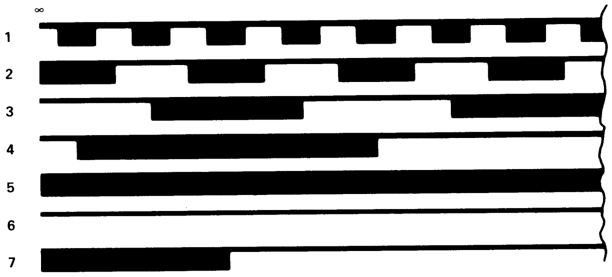


Fig. 7-4-2 Gray Codes Pattern for Lens Position Detector

The effective focus range is divided into 73 lens points and the gray codes for this 73 lens points are shown in Fig. 7-4-3.

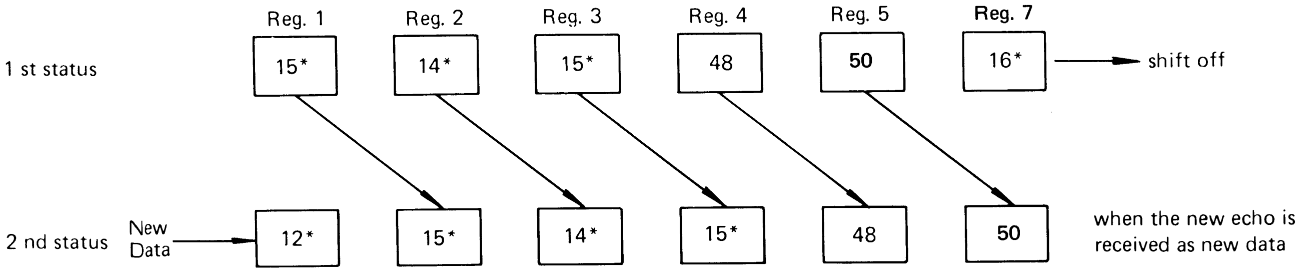


Fig. 7-4-1 7 Register/Data in MPU

	∞									10.0 m										5.0 m													3.0 m				
	73	**72**	**71**	**70**	**69**	**68**	**67**	**66**	**65**	**64**	**63**	**62**	**61**	**60**	**59**	**58**	**57**	**56**	**55**	**54**	**53**	**52**	**51**	**50**	**49**	**48**	**47**	**46**	**45**	**44**	**43**	**42**	**41**	**40**	**39**	**38**	**37**
1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1
2	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1	0	0	0	0	1
3	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1
4	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1
6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
7	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

		2.5 m										2.0 m							1.8 m										1.5 m								1.3 m
	36	**35**	**34**	**33**	**32**	**31**	**30**	**29**	**28**	**27**	**26**	**25**	**24**	**23**	**22**	**21**	**20**	**19**	**18**	**17**	**16**	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0
2	1	1	1	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1	0	0
3	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Fig. 7-4-3 Output Informations of Encoder for Position of Lens Focus Ring
(Gray Codes) : 1 : High (Open Contact)
0 : Low (Close Contact)

The numbers 1-6 of the first column in Fig. 7-4-3 is corresponded with the numbers of the connector for the focus ring position sensor in the schematic diagram. In order to eliminate the ambiguity of the number, the gray codes change only one bit when the number moves one to the next.

When the brush contact is open, the level of the contact position is HIGH (+5V) and the bit is 1 .

When the brush contact is close, the level of the contact position is LOW (0V) and the bit is 0 .

C013 is used for noise protection.

The binary codes for focus ring position/lens position is provided at pin 2 - 8 of IC001 from focus ring position sensor, then IC001 has the information of the focus ring position so that IC001 detects the lens focus position.

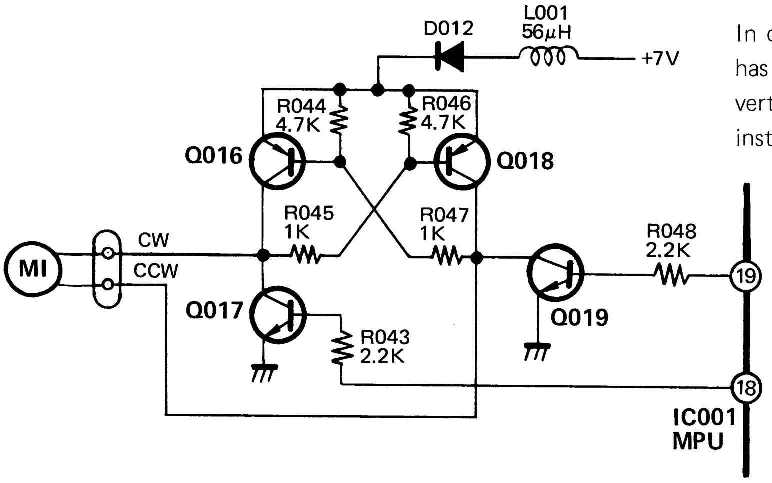


Fig. 7-4-4 Motor Driving Circuit

7-4-3 Motor Driving Circuit

Auto Focus Mode

. For clockwise rotation (FAR) :

The +5V DC is supplied from pin 19 of IC001 to the base of Q019 so that Q019 and Q016 are ON for rotating focus motor, until the focus ring becomes desired position.

. For counterclockwise rotation (NEAR) :

The +5V DC is supplied from pin 18 of IC001 to the base of Q017 so that Q017 and Q018 are ON for rotating focus motor, until the focus ring becomes desired position.

Power Focus Mode (using Camera Remote Control unit)

In order to rotate the focus ring slowly, the pulse (which has high level in 1 vertical period and low level in 2 vertical period) is supplied from pin 18 or 19 of IC001 instead of the +5V DC.

7-5 Supporting Circuit

Outline

This circuit consists of the three regulators for the power supply, thermal correction, interface and reset at the power ON and supports the stable operation of the system.

Details

7-5-1 Regulator/Power Supply

+5V DC Regulator

There is a +5V DC regulator IC007.
IC007 is the power supply for IC001, interface and reset circuits, and is always functioned even the camera is in the standby mode.

7-5-2 Thermal Correction Circuit

The speed of the ultrasonic wave in the air is effected by the temperature.
When the temperature is changed from 0°C to 40°C, the speed of the ultrasonic wave in the air is varied approx. 7%. Therefore the correction circuit is needed for the accurate measurements of the time/distance.

The standard pulse is charged from pin 16 of IC001 to C014. At the same time, the pulse generates from pin 10 of IC001, but the charging time of C014 changes by TH002. At this time, the difference of detail is detected by IC003(b) and supplied to pin 9 of IC001.

7-5-3 Interface Circuit

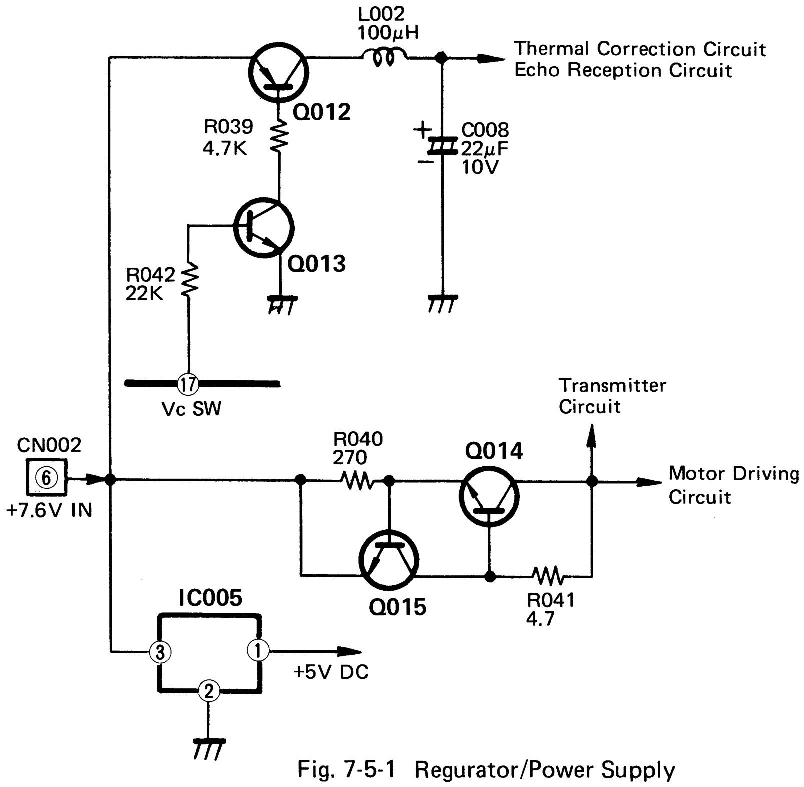
This circuit is interfaced for the informations between the camera and IC001.
The +7.6V DC is supplied to the reset circuit when the camera is Power ON condition.
Then Q020 is momently ON and Q021 is OFF.
Therefore the voltage is supplied to pin 26 of IC001 and IC001 is reset.
The informations at 12 pins connector of AF connector CN107 are as;

Camera Operation without Camera Remote Control Unit

The informations at 5 pins connector are as;

(a) Pin 1
This signal is sent from automatic iris control circuit on micro processor board to drive coil of lens iris motor in order to open/close lens iris.

(b) Pin 2
Ground



L002
100μH
Thermal Correction Circuit
Echo Reception Circuit
Q012
R039
4.7K
C008
22μF
10V
Q013
R042
22K
17
Vc SW
Transmitter Circuit
CN002
6
+7.6V IN
R040
270
Q014
Motor Driving Circuit
Q015
R041
4.7
IC005
3
1
2
+5V DC

Fig. 7-5-1 Regurator/Power Supply

(c) Pin 3

This signal is occurred by moving lens iris inside the damper coil. This induced voltage is fed to automatic iris control circuit on micro processor board.

(d) Pin 4

+1.8V DC

(e) Pin 5

When the camera is power on , the +7.6V is supplied to auto focus lens board. In case of playback, the +7.6V isn't supplied to there.

(f) Pin 6

Not used

(g) Pin 7

This signal is sent from zoom control circuit on deflection board. When the TELE switch SW102 on the handle grip is depressed, the camera lens does zoom-in (telephoto) operation.

(h) Pin 8

This signal is sent from zoom control circuit on deflection board. When the WIDE switch SW103 is depressed, the camera lens does zoom-out (wide angle) operation.

(i) Pin 9

Ground

(j) Pin 10

. Camera Operation without Camera Remote Control Unit

The positive polarity Vs at pin 10 of CN107 is supplied to the base of Q023 through C023 so that Q023 is ON for detecting Vs pulse at pin 25 of IC001. Pin 20 of IC001 supplies the signal as;

. HIGH : Without Camera Remote Control Unit
. LOW : With Camera Remote Control Unit

Pin 20 of IC001 supplies HIGH signal to the base of Q025 through R063 for effecting the switches, SW001 and SW002.

Q024 is not functioned for only Vs signal.

When the switch SW001 (AUTO FOCUS ON/OFF) is open, the Auto Focus mode is OFF position and Q025 is ON by applying the HIGH at the base of Q025 so that pin 24 of IC001 becomes LOW for the manual focusing or remote focusing.

When SW001 is close, the Auto Focus mode is ON position and the base of Q025 becomes LOW and Q025 is OFF so that pin 24 of IC001 becomes HIGH for the automatic focusing. When SW001 is open and the SW002 (AUTO/MAN) is kept pressing, the base of Q025 also becomes LOW so that pin 24 of IC001 becomes HIGH for the automatic focusing.

When Vs is not supplied, IC001 detects that the camera is in the standby mode and supplies HIGH at pin 17 of IC001 to shut off transmission, echo-reception, thermal correction and motor driving circuit are not functioned.

. Camera Operation with Camera Remote Control Unit

When the Camera Remote Control Unit is connected, the HIGH is supplied to the base of Q022 from pin 11 of CN107 and Q022 is ON so that pin 23 of IC001 becomes LOW to identify for the connection of the camera remote control unit.

IC001 supplies the LOW to the base of Q025 through R063 so that the switches SW001 and SW002 and Q025 are not functioned.

(1) Vs + 0V DC for Auto Focus Mode :

When 0V DC is supplied from pin 10 of CN107 to the base of Q024 through R060 so that Q024 becomes OFF. And also Vs is supplied to the base of Q023 through C023 so that Q023 is ON while the Vs is applied.

The level at pin 24 of IC001 is HIGH for the automatic focusing.

(2) Vs + 2V DC (±1V) for Manual Focus Mode :

When 2V DC ±1V is supplied from pin 10 of CN107 to the base of Q024 and then Q024 is ON so that the level at pin 24 of IC001 becomes LOW for the manual focusing or power focusing.

(3) No Vs for Standby Mode :

When Vs is not supplied from pin 10 of CN107, IC001 detects no Vs at pin 25 of IC001 so that IC001 supplies the HIGH at pin 17 of IC001 to shut off the +9V DC regulator.

(k) Pin 11

When the camera remote control unit is not connected, pin 11 of CN107 is open and the base voltage of Q022 becomes LOW. Then Q022 is OFF so that pin 23 of IC001 becomes HIGH to identify for no remote control unit.

When the camera remote control unit is connected, the following informations per each status is supplied at the base of Q022 to identify the status of the camera remote control unit as;

1. HIGH for STOP mode
2. Positive Polarity Vs for FAR mode
3. Negative Polarity Vs for NEAR mode

(l) Pin 12

Not used

8 Electronic Viewfinder Board (YFVPKA0706JA)

8-1 Video Amplifier Circuit

Outline

This circuit amplifies the video signal supplied from the Deflection board and fed it to the cathode ray tube (CRT).

Details

The video signal mixed with level indicator signal and character signal from the Deflection board is supplied to amplifier Q2 through pin No. 6 of EVF connector CN102, terminal No. 8 of CN1 and VR3 (CONTRAST). The amplified video signal at the collector of Q2 is then supplied to grid-1(G1) of the CRT through terminal No. 6 of BI1 and CRT socket CN104 together with DC voltage set by VR2 (BRIGHTNESS).

8-2 Horizontal Deflection Circuit

Outline

This circuit generates the horizontal(H) deflection sawtooth current for H.scanning beam inside the cathode ray tube (CRT).

Details

The frequency controlled horizontal drive (H.D.) pulse from the Deflection board is supplied to the base of switching amplifier Q1 through pin No. 1 of EVF connector CN102 and terminal No. 3 of CN1.
The horizontal(H) deflection sawtooth current obtained at the collector of Q1 is supplied to the H.deflection coil through C9, L2, VL3 (H.SIZE) and terminal No. 2 of CN2.
The flyback pulse obtained at the collector of Q1 is also fed to the high voltage circuit.

8-3 High Voltage Circuit

Outline

This circuit generates high voltages for cathode ray tube (CRT) electrodes.

Details

The flyback pulse generated in the horizontal(H) deflection circuit is supplied to primary winding of the flyback transformer (FBT) in high voltage pack T1 to step up the flyback pulse to necessary level. The boosted pulses obtained at the secondary winding of the transformer are rectified to generate high voltages.
+4.5KV obtained by rectifying the boosted pulse is supplied to the CRT anode.
+600V obtained by rectifying the boosted pulse is supplied to grid-3(G3) of the CRT through VR1 (FOCUS). The voltage of grid-2(G2) is derived by dividing +600V by VR1, R1 and R2.
The voltage of grid-1(G1) is derived by rectifying the negative pulse from the FBT. Then the rectified -55V is supplied to G1 through VR2 (BRIGHTNESS) together with the video signal supplied from the video amplifier circuit.
The heater voltage for CRT is supplied +4.8V and +7.6V from the Deflection board through EVF connector CN102 and CN1.

9 Camera Remote Control Unit (Option) : WV-CR10E

Outline

This camera remote control unit, WV-CR10E is used to control the camera operations remotely with the detached EVF unit for Power Zoom, Power Focus, Auto Focus Auto/Man Selection, Fade and VTR Start/Stop Switch (REC).

Details

9-1 Power Zoom

The switch for WIDE and TELE is the seesaw type switch so that only either switch is ON or OFF. The WIDE switch, SW6 is connected with the base of Q2 on Audio/Lens Control board through camera remote connector CN105.
The TELE switch, SW7 is connected with the base of Q4 on Audio/Lens Control board through camera remote connector CN105.
When the WIDE switch, SW6 is closed, the base of Q2 becomes LOW and Q2 is turned ON. The base of Q4 is HIGH so that Q004 is OFF. The base of Q3 also becomes LOW so that Q3 is turned ON and drives the power zoom motor for WIDE.
When the TELE switch, SW7 is closed, the base of Q4 on Audio/Lens Control board becomes LOW and Q4 is turned ON. The base of Q2 is HIGH so that Q2 is OFF.

The base of Q1 also becomes LOW so that Q1 is turned ON and drives the power zoom motor for TELE.

The power zoom switch on the adjustable handle grip has priority.

When the WIDE switch on the camera is pressed during the TELE switch, SW7 on the camera remote control unit is closed, the base of Q005 on the camera remote control unit becomes LOW so that Q005 is OFF and the WIDE switch on the grip is activated.

When the TELE switch on the grip is pressed during the WIDE switch, SW6 on the camera remote control unit is closed, the base of the Q004 on the camera remote control unit becomes LOW so that Q004 is OFF and the TELE switch on the grip is activated.

9-2 Auto-Manual Selection

When the AUTO/MAN selection switch, SW3 is placed at AUTO side, Q003 on the camera remote control unit is OFF so that the collector of Q003 is LOW.

The signal at pin 2 of camera remote connector CN105 is (Vs + 0V DC) which is supplied to AF (Auto Focus) connector through Audio/Lens Control board.

When the AUTO/MAN selection switch, SW3 is placed at MAN side, Q003 is ON so that the collector of Q003 is HIGH.

The signal at pin 2 of camera remote control connector CN105 is (Vs + HIGH V DC) which is supplied to AF connector through deflection board.

9-3 Power Focus

The vertical scanning start pulse Vs (positive polarity) is supplied from pin 2 of camera remote connector CN105 to the base of Q001 so that the positive polarity Vs is inverted and the negative one is obtained at the collector of Q001.

The negative polarity Vs is also supplied from the collector of Q001 to the base of Q002 so that the positive polarity Vs is obtained at the collector of Q002.

The signal at pin 4 of camera remote connector CN105 is obtained according to the position of the power focus switch as;

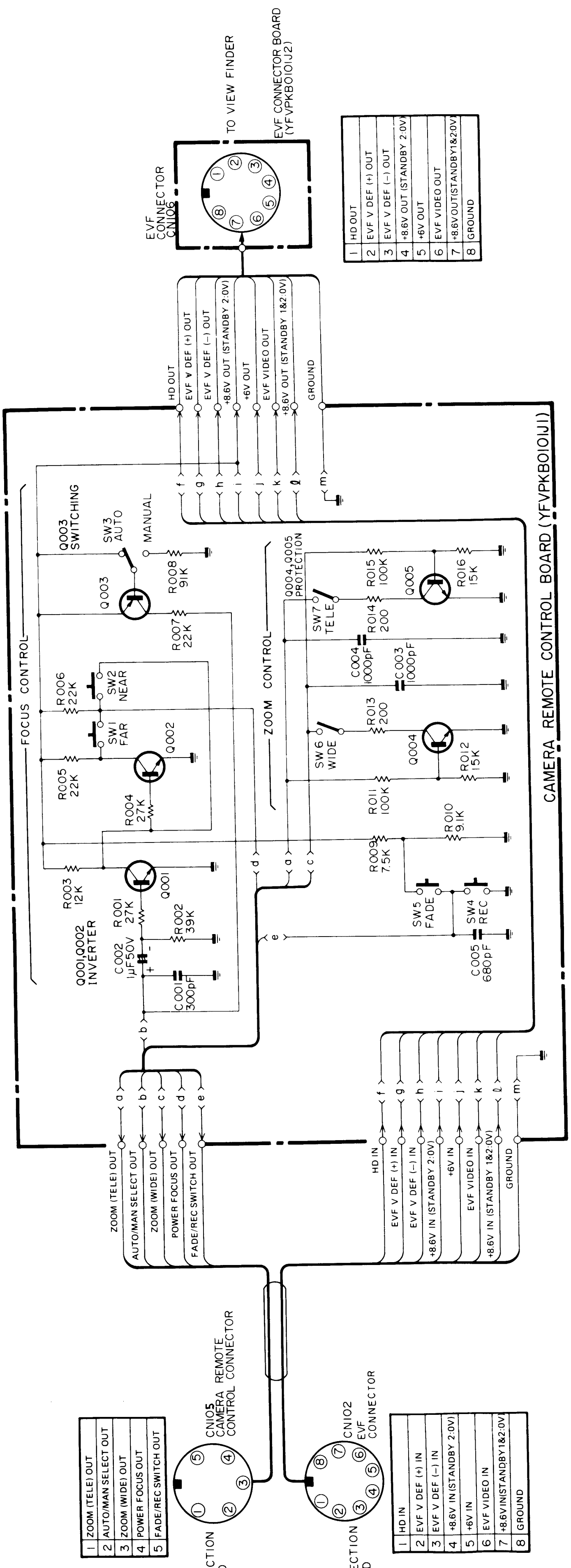
. By pressing SW1, FAR : Positive Polarity Vs
. By pressing SW2, NEAR : Negative Polarity Vs
. By no pressing SW, STOP : HIGH V DC

and is supplied to pin 1 of Lens connector, CN107 through Audio/Lens Control board.

9-4 FADE and REC Switch

When the FADE switch SW5 is pressed, +4.8V DC is supplied to pin 5 of camera remote connector CN105. This +4.8V DC is supplied to process board through Audio/Lens Control board and the camera is ready for FADE-IN or FADE-OUT.

When the REC switch SW4 is pressed, the low level is supplied to the pin 5 of CN105. This low level is supplied to the process board through Audio/Lens Control board and the camera becomes the REC-PLAY or REC-PLAY-PAUSE mode.



TO VIEW FINDER
EVF CONNECTOR BOARD (YFVPKB010IJ2)
EVF CONNECTOR CN106
1 HD OUT
2 EVF V DEF (+) OUT
3 EVF V DEF (−) OUT
4 +8.6V OUT (STANDBY 2.0V)
5 +6V OUT
6 EVF VIDEO OUT
7 +8.6V OUT(STANDBY1&2.0V)
8 GROUND
HD OUT
EVF V DEF (+) OUT
EVF V DEF (−) OUT
+8.6V OUT (STANDBY 2.0V)
+6V OUT
EVF VIDEO OUT
+8.6V OUT (STANDBY 1&2.0V)
GROUND
CAMERA REMOTE CONTROL BOARD (YFVPKB010IJ1)
FOCUS CONTROL
ZOOM CONTROL
Q003 SWITCHING
SW3 AUTO
MANUAL
Q003
R008 91K
R007 22K
R006 22K
SW2 NEAR
SW1 FAR
Q002
R005 22K
R004 27K
R003 12K
Q001
R001 27K
R002 39K
Q001,Q002 INVERTER
C002 1μF50V
C001 300pF
Q004,Q005 PROTECTION
SW7 TELE
R015 100K
Q005
R016 15K
R014 200
C004 1000pF
C003 1000pF
SW6 WIDE
R013 200
Q004
R012 15K
R011 100K
R010 9.1K
R009 7.5K
SW5 FADE
SW4 REC
C005 680pF
a b c d e f g h i j k ℓ m
ZOOM (TELE) OUT
AUTO/MAN SELECT OUT
ZOOM (WIDE) OUT
POWER FOCUS OUT
FADE/REC SWITCH OUT
HD IN
EVF V DEF (+) IN
EVF V DEF (−) IN
+8.6V IN (STANDBY 2.0V)
+6V IN
EVF VIDEO IN
+8.6V IN (STANDBY 1&2.0V)
GROUND
CN105 CAMERA REMOTE CONTROL CONNECTOR
1 ZOOM (TELE) OUT
2 AUTO/MAN SELECT OUT
3 ZOOM (WIDE) OUT
4 POWER FOCUS OUT
5 FADE/REC SWITCH OUT
TO DEFLECTION BOARD
CN102 EVF CONNECTOR
1 HD IN
2 EVF V DEF (+) IN
3 EVF V DEF (−) IN
4 +8.6V IN (STANDBY 2.0V)
5 +6V IN
6 EVF VIDEO IN
7 +8.6VIN(STANDBY1&2.0V)
8 GROUND
TO DEFLECTION BOARD

Fig. 9 Camera Remote Control Unit

ORDER NO. VKD83070765C4

Service Manual

Vol. 2

Adjustment Procedures
Trouble Shooting Guides

Color Video Camera
WV-4860

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Panasonic®

Panasonic Tokyo
Matsushita Electric Industrial Co., Ltd.
1-2, 1-chome, Shibakoen, Minato-ku, Tokyo 105 Japan

1. TEST EQUIPMENT REQUIRED

The following equipment is required for adjustment of WV-4860 color camera.

- Oscilloscope (dual trace, delayed, 25MHz bandwidth, with three probes)
- Digital voltmeter (DVM)
- Frequency counter
- Vectorscope
- Color video monitor
- Tripod
- Lighting (140 footcandles (1400 lux), 3200° K)
- Light meter
- Thermometer
- Logarithmic gray scale chart (Part No. YWV2310RB99) (Fig. 1-1).

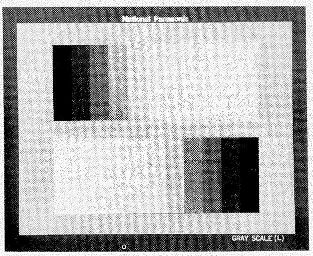

National Panasonic
GRAY SCALE (L)

Fig. 1-1

- Color chart (Part No. YWV2100RB98) (Fig. 1-2)

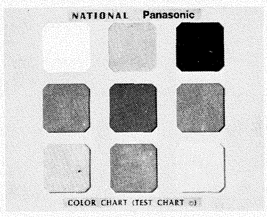
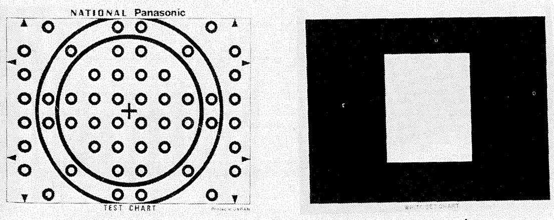

NATIONAL Panasonic
COLOR CHART (TEST CHART ○)

Fig. 1-2

- Ball/White set chart (Part No. YWV2100RB03) (Fig. 1-3)


NATIONAL Panasonic
TEST CHART

Ball chart

White set chart

Fig. 1-3

Test equipment denoted by shaded outlines are not required if only pick-up tube is replaced.

2. DISASSEMBLY PROCEDURE FOR ADJUSTMENT

2-1 Camera Unit

. Turn off the power.

. Remove two screws on rear side of the side cover holding the both side covers. (Fig. 2-1-1)

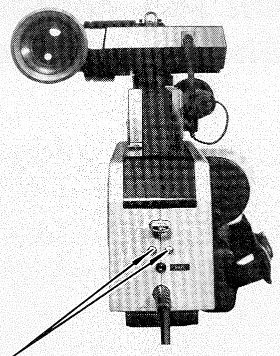

Remove two screws

Fig. 2-1-1

Remove the both side covers by sliding them backward. (Fig. 2-1-2, Fig. 2-1-3)

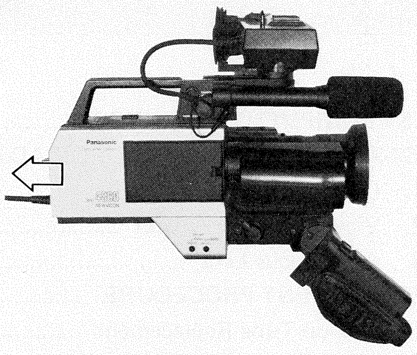


Fig. 2-1-2

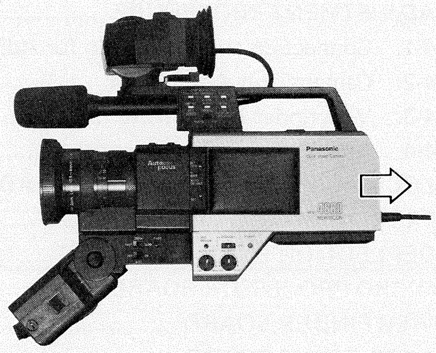


Fig. 2-1-3

- Remove two screws which hold the each of Process board, and Deflection board in order to gain access to the desired circuitry

(A) For right side PCB (Viewed from the front)
Process Board (YFVKZ4860P3A)

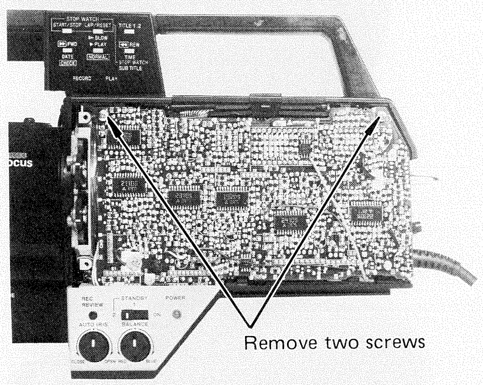

Remove two screws

Fig. 2-1-4

(B) For left rear side PCB (Viewed from the front)
Deflection Board (YFVKY4860P1A)

(C) For left front side PCB (Viewed from the front)
Micro Processor Board (YFVKY3230P4A)

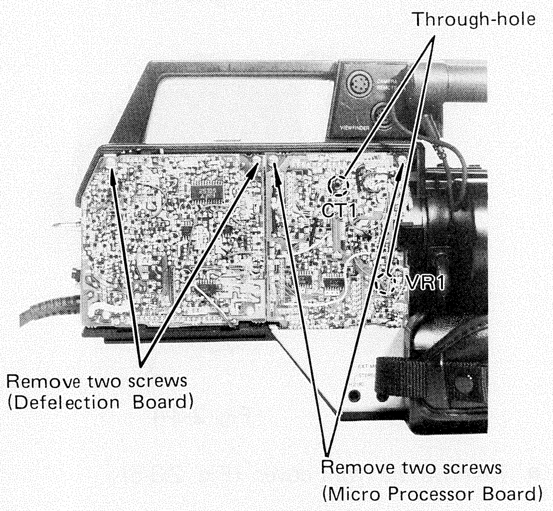

Through-hole
CT1
VR1
Remove two screws
(Defelection Board)
Remove two screws
(Micro Processor Board)

Fig. 2-1-5

Note : Do not remove two screws holding the Micro processor board.
please use the through-hole when adjusting Micro processor board.
Remove two screws which holding Micro processor board and disconnect CN1 and CN2 when adjusting backfocus and replacing the pick-up tube. (See page 4)

Caution : The plug (CN2) of Key board (B) becomes poor contact due to shave out the carbon conductor from plastic face plate, when connection and disconnection are repeated several times. In such a case, cut 2 ~ 3 mm of the edge portion of plug for restoration of the contact. (Fig. 2-1-6)

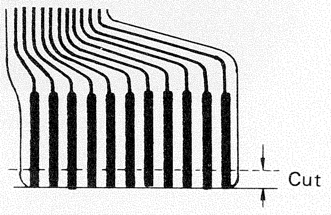


Fig. 2-1-6

2-2 Viewfinder (EVF) Unit

- Disconnect the viewfinder connector.
- Unlock the EVF lock lever. (Fig. 2-2-1)

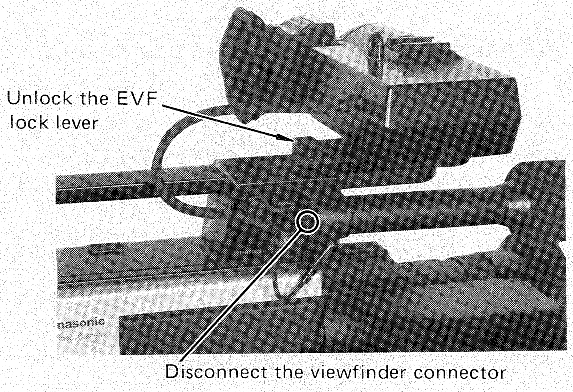

Unlock the EVF lock lever
Disconnect the viewfinder connector

Fig. 2-2-1

- Remove the viewfinder by pulling it forward while pressing EVF release button. (Fig. 2-2-2)

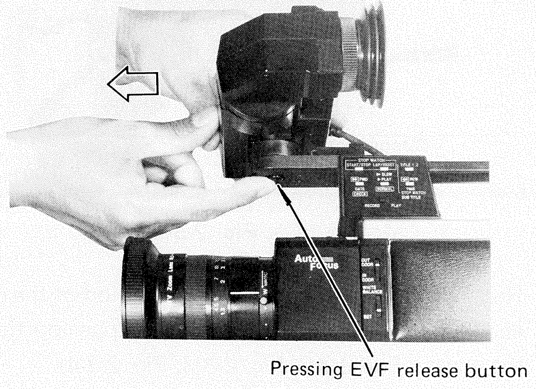

Pressing EVF release button

Fig. 2-2-2

- Remove two screws from the bottom and remove bottom cover. (Fig. 2-2-3, Fig. 2-2-4)

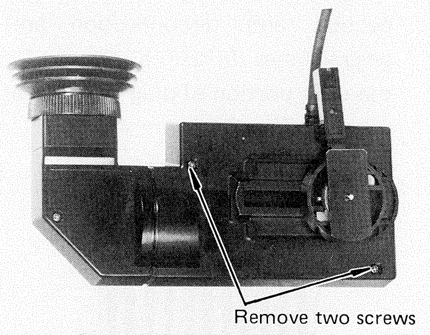

Remove two screws

Fig. 2-2-3

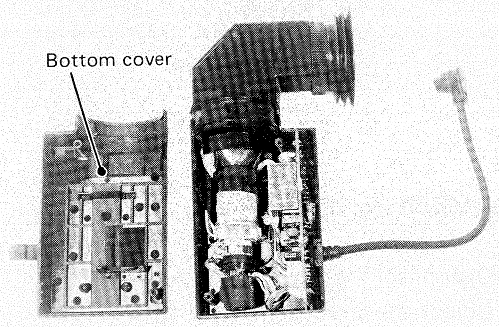

Bottom cover

Fig. 2-2-4

2-3 Auto Focus Lens

- Disconnect the lens connector.
- Make sure that the microphone is removed.
- Remove the lens hood by turning it counterclockwise.
- While depressing the lens release button backward, remove the lens by turning clockwise (approximately 60°). (Fig. 2-3-1)

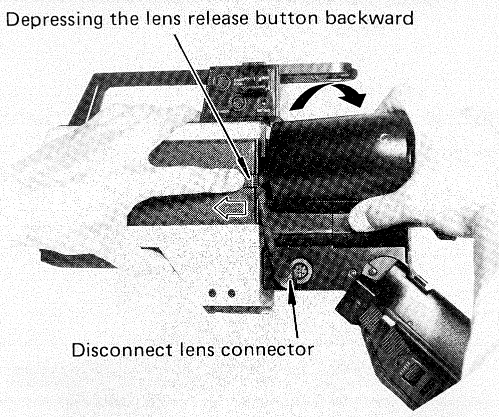

Depressing the lens release button backward
Disconnect lens connector

Fig. 2-3-1

- Remove four screws on the front portion of the cover and remove the two screws on the upper portion of the cover. (Fig. 2-3-2, Fig. 2-3-3, Fig. 2-3-4)

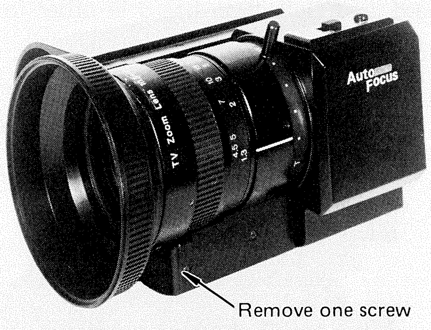

Auto Focus
TV Zoom Lens
Remove one screw

Fig. 2-3-2

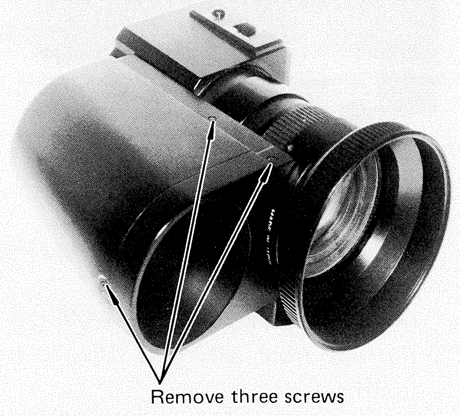

Remove three screws

Fig. 2-3-3

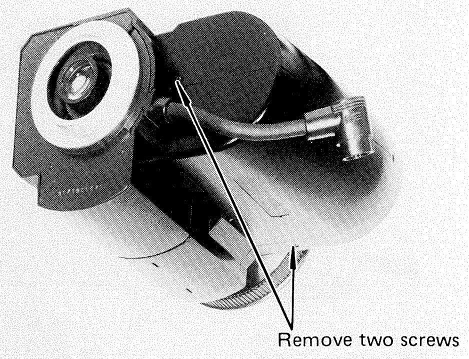

Remove two screws

Fig. 2-3-4

- Remove the front cover. (Fig. 2-3-5)

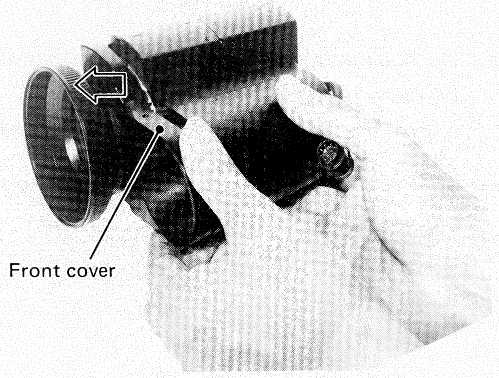

Front cover

Fig. 2-3-5

- Remove the upper cover. (Fig. 2-3-6)

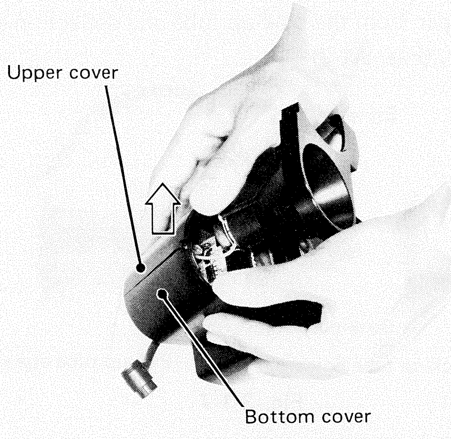

Upper cover
Bottom cover

Fig. 2-3-6

- **Note :** When adjusting the Auto focus lens unit, put back only the front cover and tighten one screw tentatively for holding the front cover. (Fig. 2-3-7)

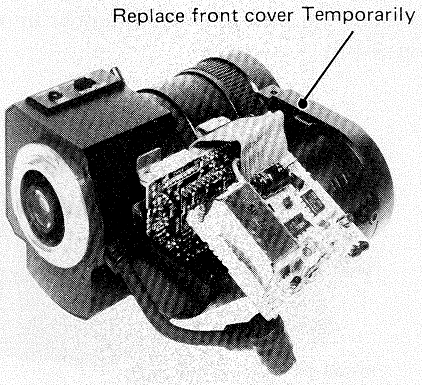

Replace front cover Temporarily

Fig. 2-3-7

- **Note :** When replacing the upper cover, make sure that the printed circuit boards are in the groove of the case. (Fig. 2-3-8)

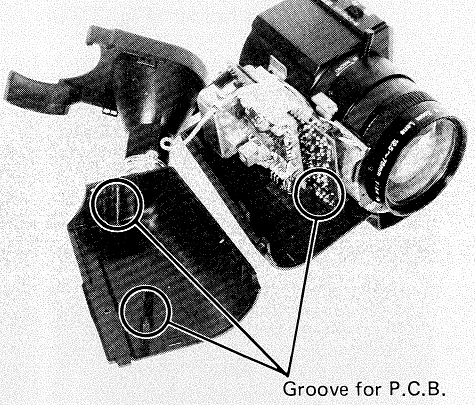

Groove for P.C.B.

Fig. 2-3-8

3. REPLACEMENT PROCEDURE

3-1 Pick-up Tube Replacement

Note : When replacing pick-up tube, surely replacing together with FAMOS IC (FAMOS Kit).

- Disassemble the camera as previously described in Section 2 "DISASSEMBLY PROCEDURE FOR ADJUSTMENT" on page 1.
- Remove the EVF and Microphone from the camera. (Refer to 2-2 and 2-3 on page 3)
- Disconnect the CN1 and CN2 on micro processor board. (Fig. 3-1-1)

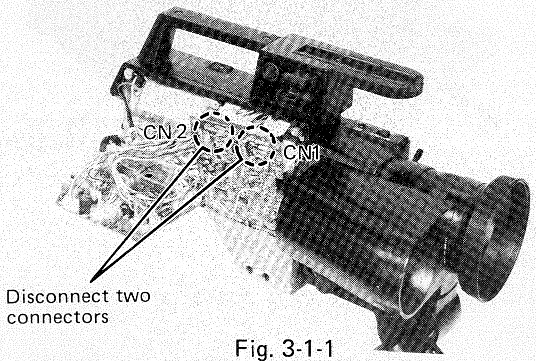

CN2
CN1
Disconnect two connectors

Fig. 3-1-1

- Unsolder the shield cover ground wire and remove one screw holding shield cover A and B and remove them.

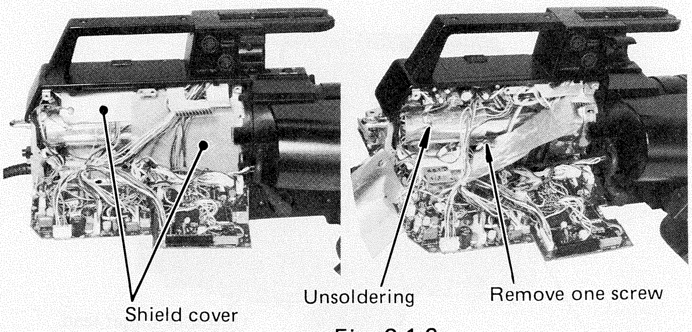

Shield cover
Unsoldering
Remove one screw

Fig. 3-1-2

- Remove two screws and unsolder two points holding the coil holder shield plate and preamplifier board holder shield plate and remove these shield plates. (Fig. 3-1-3)

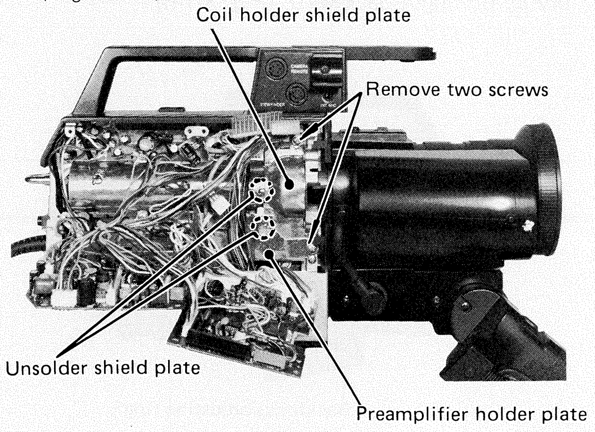

Coil holder shield plate
Remove two screws
Unsolder shield plate
Preamplifier holder plate

Fig. 3-1-3

- Remove two screws holding the shield plate and remove the shield plate by pulling it backward, while pulling the other side of shield plate forward.
- Remove preamplifier shield case by pulling it outward. (Fig. 3-1-4)

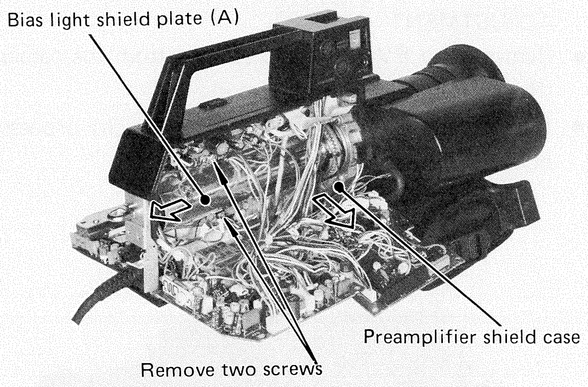

Bias light shield plate (A)
Preamplifier shield case
Remove two screws

Fig. 3-1-4

- Unsolder the target lead.
- Disconnect pick-up tube socket from the pick-up tube.
- Remove two screws holding pick-up tube holder.
- Remove the backfocus adjusting ring from the coil holder by turning it counterclockwise (Viewed from the rear) (Fig. 3-1-5)

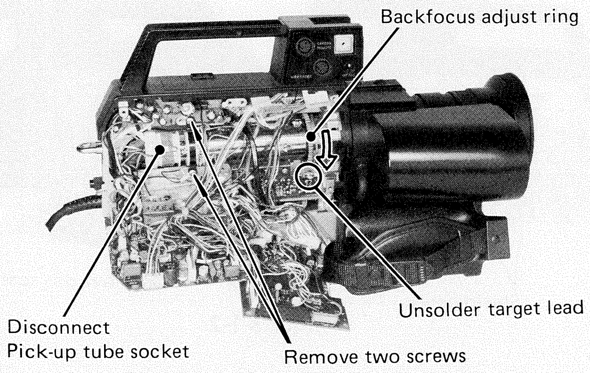

Backfocus adjust ring
Unsolder target lead
Disconnect
Pick-up tube socket
Remove two screws

Fig. 3-1-5

- Remove the pick-up tube and deflection coil assembly by pulling it backward. (Fig. 3-1-6)

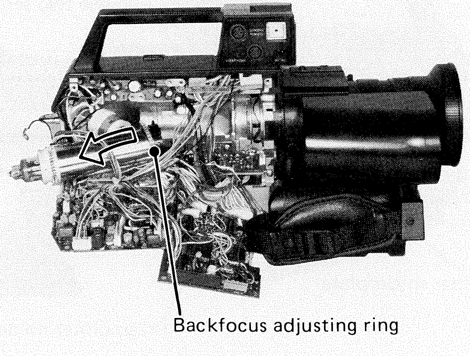

Backfocus adjusting ring

Fig. 3-1-6

- Take out the backfocus adjusting ring and pick-up tube holder from the pick-up tube and deflection coil assembly. (Fig. 3-1-7)

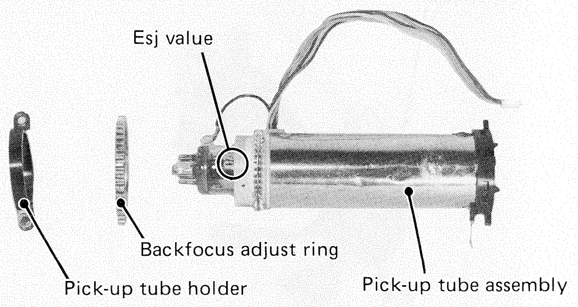

Esj value
Backfocus adjust ring
Pick-up tube holder
Pick-up tube assembly

Fig. 3-1-7

- Clean the new pick-up tube faceplate with the lens cleaning tissue or cloth.

Note : The Esj value stamped on the neck of pick-up tube for target voltage adjustment.

- Return the backfocus adjusting ring and pick-up tube holder to pick-up tube assembly. (Fig. 3-1-7)
- Reinstall the pick-up tube assembly into the chassis. (Fig. 3-1-8)

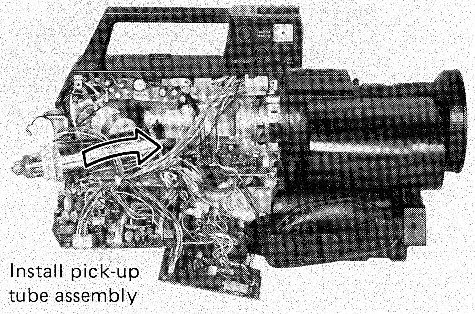

Install pick-up
tube assembly

Fig. 3-1-8

Note : 1. The target lead has to be positioned downward.
2. Make sure that the protruding part of the deflection coil engages the recessed part of the coil holder (Fig. 3-2-9)

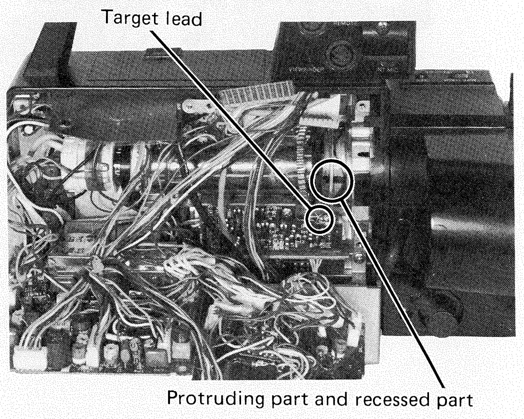

Target lead
Protruding part and recessed part

Fig. 3-1-9

- Reinstall the pick-up tube holder and connect the pick-up tube socket.
- Reinstall the backfocus adjusting ring to the coil holder by turning it clockwise (Viewed from rear).
- Solder the target lead. (Fig. 3-1-10)

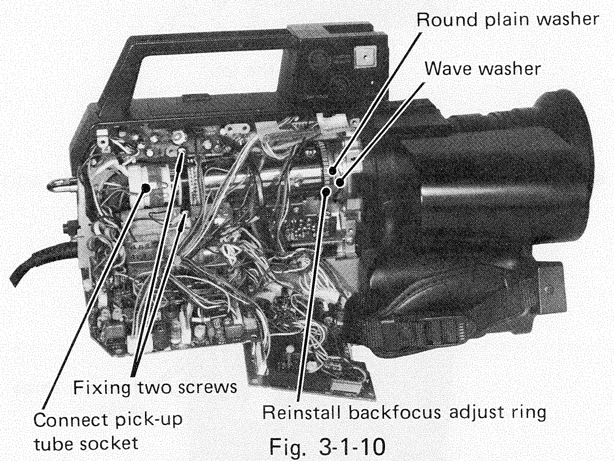

Round plain washer
Wave washer
Fixing two screws
Connect pick-up tube socket
Reinstall backfocus adjust ring

Fig. 3-1-10

Note : Make sure that the wave washer and round plain washer are placed into prescribed position.

- Remove two screws on the shield case cover on the process board and remove the shield case cover. (Fig. 3-1-11)

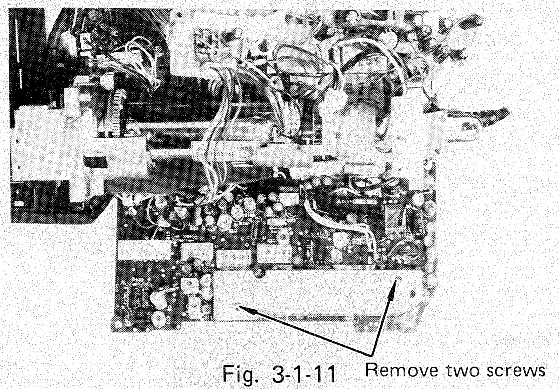

Remove two screws

Fig. 3-1-11

- Remove the FAMOS IC from IC socket and replace to the new one. (Fig. 3-1-12)

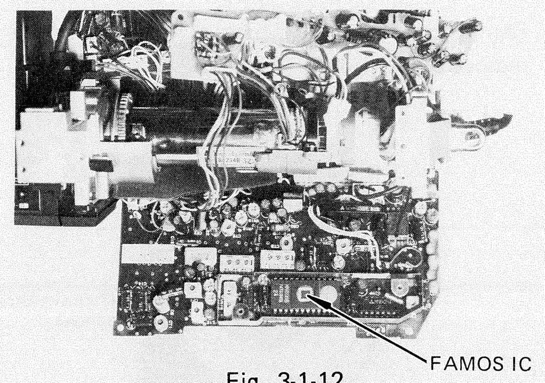


Fig. 3-1-12

- Replace the shield case cover.
- After replacing the pick-up tube assembly and FAMOS IC, adjust the camera while refering to Section 4. "ADJUSTMENT PROCEDURE" on page 11.

3-2 Display key Board Replacement

- Disassemble the camera as previously described in Section 2 "DISASSEMBLY PROCEDURE FOR ADJUSTMENT" on page 1.
- Remove the Microphone and EVF from camera. (Refer to 2-2 and 2-3 on page 2)
- Remove two screws holding the handle cover and three screws holding EVF mounting on the upper cover. And remove the handle cover by pulling upward and EVF mounting. (Fig. 3-2-1)

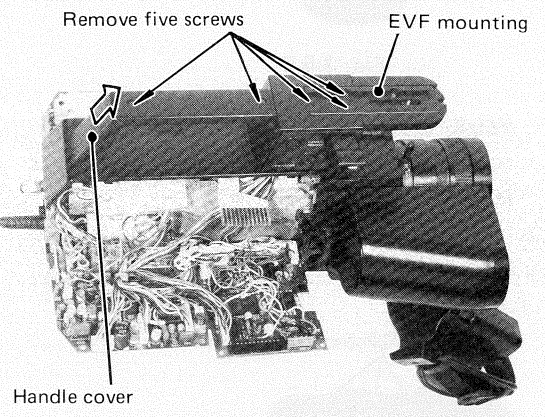

Remove five screws
EVF mounting
Handle cover

Fig. 3-2-1

- Remove one screw holding the microphone mounting base and one screw holding upper cover. (Fig. 3-2-2)

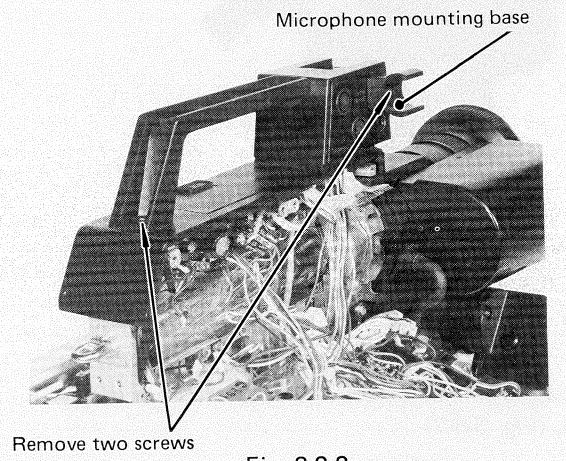

Microphone mounting base
Remove two screws

Fig. 3-2-2

- Lift the rear side of upper cover.

  Remove the key board (A) by pressing the key board locking tab on the bottom inside of the key board to upward.
- Remove the Microphone connector and EVF board by the same procedure. (Fig. 3-2-3, Fig. 3-2-4)

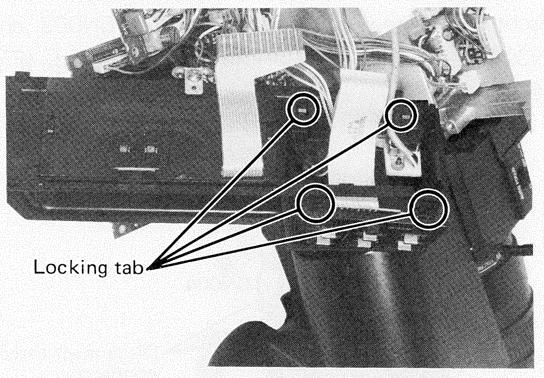

Locking tab

Fig. 3-2-3

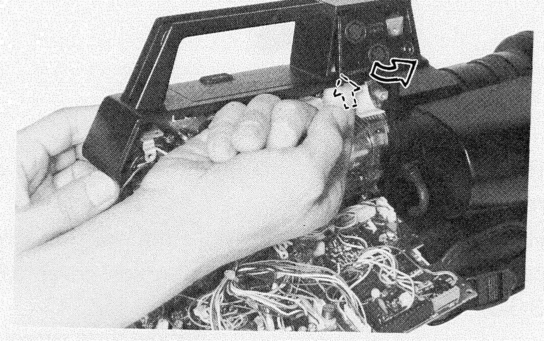


Fig. 3-2-4

- Remove the upper cover by pulling it upward.
- Remove the key board (B) locking pin. (Fig. 3-2-5)

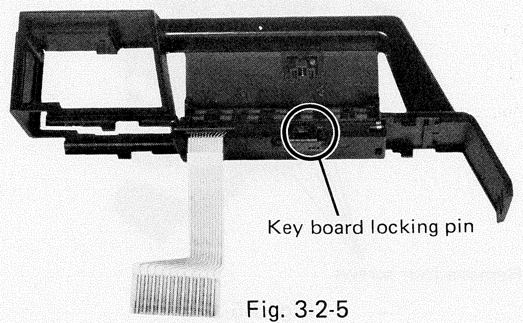

Key board locking pin

Fig. 3-2-5

- Remove the key board (B) by pulling it outward while keeping it slant. (Fig. 3-2-6)

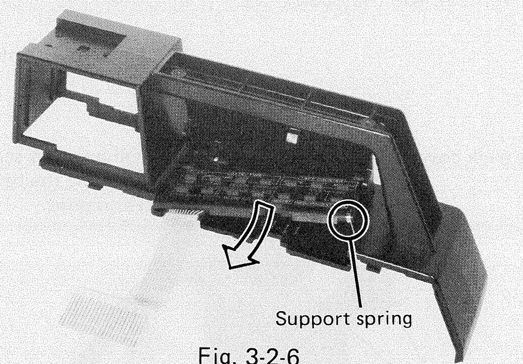

Support spring

Fig. 3-2-6

Note : When replacing the key board (B), make sure that the support spring is installed in prescribed position.

3-3 Microphone Unit Replacement

- Disconnect the microphone connector.
- Remove the microphone by pulling it forward. (Fig. 3-3-1)

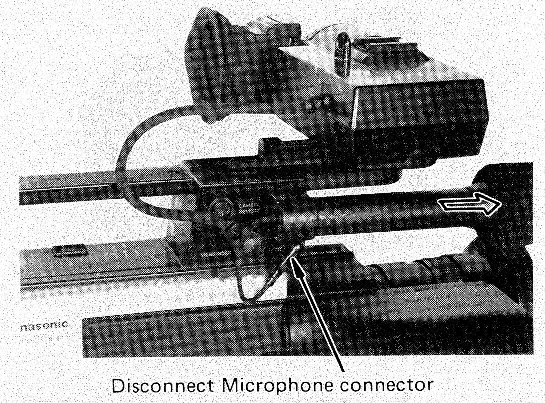

nasonic
Disconnect Microphone connector

Fig. 3-3-1

3-4 CRT Replacement

- Disassemble the EVF as previously described in Section 2 "DISASSEMBLY PROCEDURE FOR ADJUSTMENT" on page 1.
- Remove one screw from top side of CRT case and remove the case. (Fig. 3-4-1, Fig. 3-4-2)

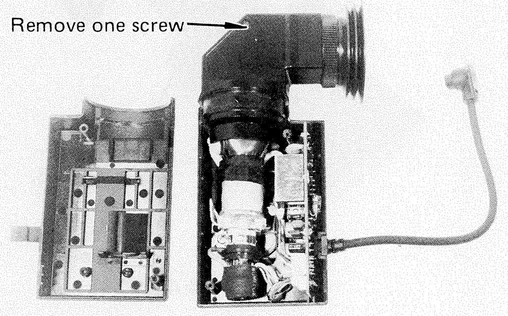

Remove one screw

Fig. 3-4-1

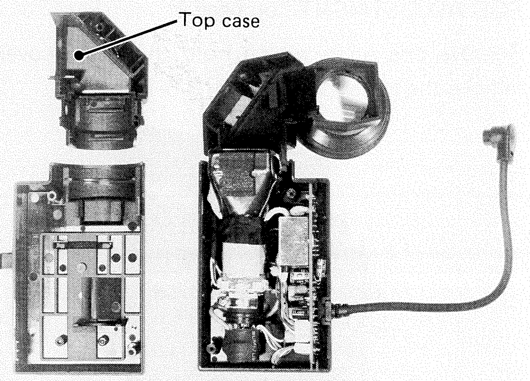


Fig 3-4-2

- After replacing the parts, reinstall the EVF in revers order of disassembly procedure.

Note : 1. When reinstalling the bottom cover, make sure that the plate spring is attached on the top cover. (Fig. 3-4-3)

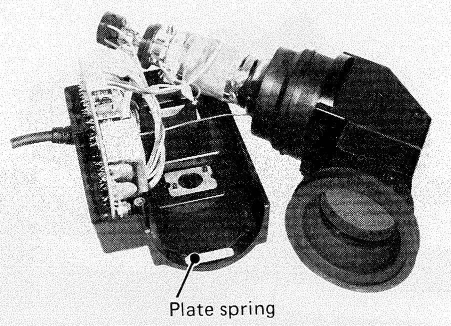


Plate spring

Fig. 3-4-3

Note : 2. When replacing CRT and case assembly, make sure that the CRT socket assembly and printed circuit board are in the groove portion of the bottom cover. (Fig. 3-4-4)

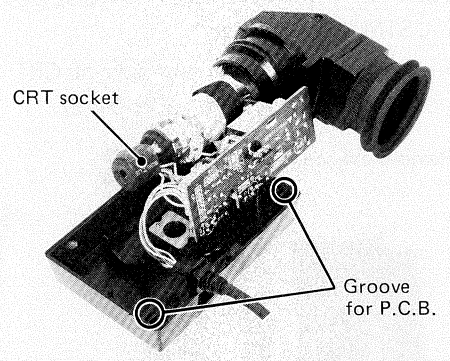

CRT socket
Groove for P.C.B.

Fig. 3-4-4

3-5 Lens Replacement

- Disassemble the auto focus lens as previously described in Section 2 "DISASSEMBLY PROCEDURE FOR ADJUSTMENT" on page 1.
- Remove one screw which hold the lower cover and remove the lower cover. (Fig. 3-5-1)

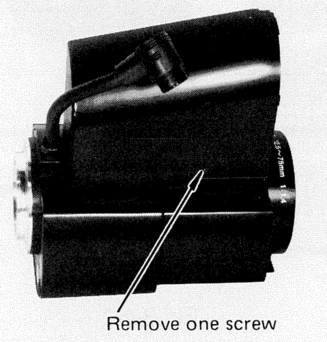

Remove one screw

Fig. 3-5-1

- Disconnect three connectors CN002, CN003 and CN004 and remove the printed circuit board. (Fig. 3-5-2)

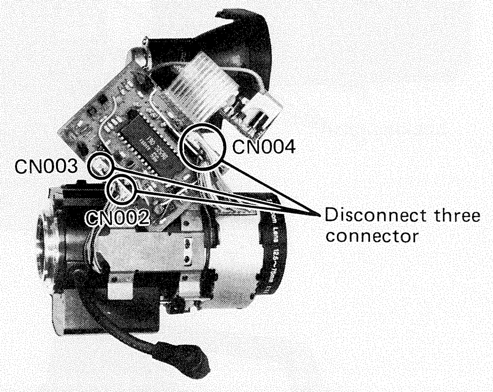

CN003
CN004
CN002
Disconnect three connector

Fig. 3-5-2

- Remove four screws which hold the cover holder and remove the cover holder.
- Remove three screws which hold the position sensor cover and remove the position sensor cover. (Fig. 3-5-3)

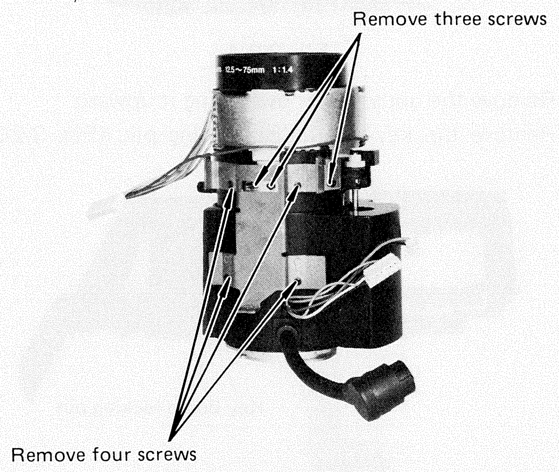

Remove three screws
Remove four screws

Fig. 3-5-3

- Remove three screws which hold the iris back cover and insert the minus screw driver to the gap, then remove the iris back cover. (Fig. 3-5-4, Fig. 3-5-5)

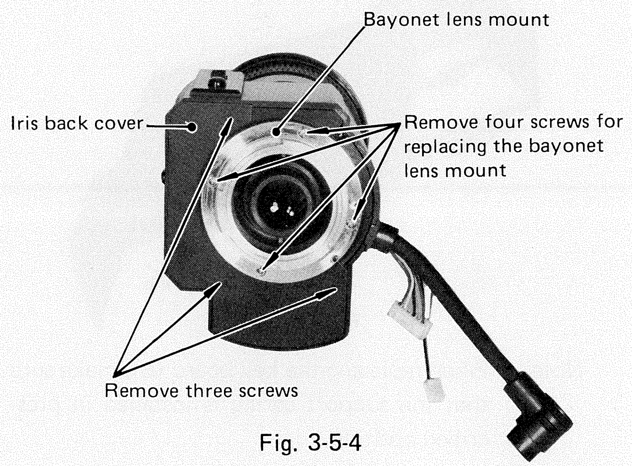

Bayonet lens mount
Iris back cover
Remove four screws for replacing the bayonet lens mount
Remove three screws

Fig. 3-5-4

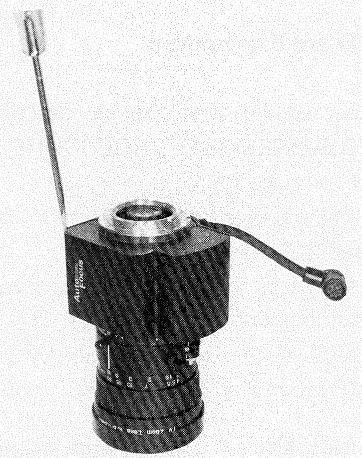


Fig. 3-5-5

Note : When replacing the bayonet lens mount, remove four screws and remove the bayonet lens mount. (Fig. 3-5-4)

- Remove three screws which hold the lens mounting assembly and remove the lens mounting assembly. (Fig. 3-5-6)

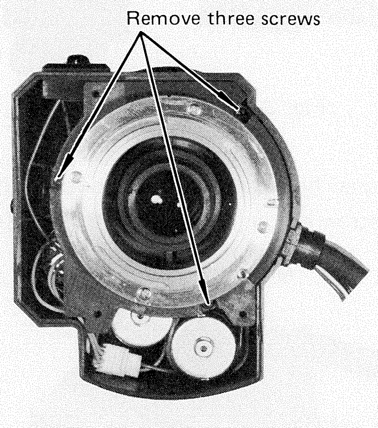

Remove three screws

Fig. 3-5-6

- Disconnect the CN005.
- Remove the lens connector cable assembly from the iris cover.
- Remove two screws which hold the zoom focus motor assembly and remove the zoom focus motor assembly. (Fig. 3-5-7)

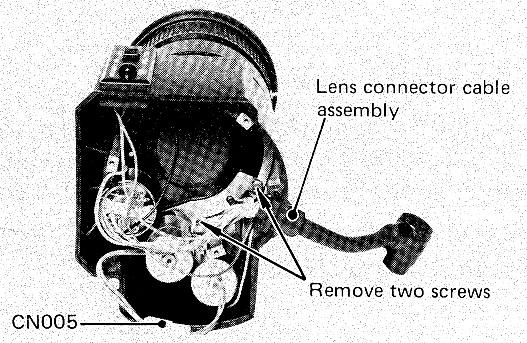

Lens connector cable assembly
Remove two screws
CN005

Fig. 3-5-7

- Press the tab which hold the switch cover and remove the switch cover. (Fig. 3-5-8)

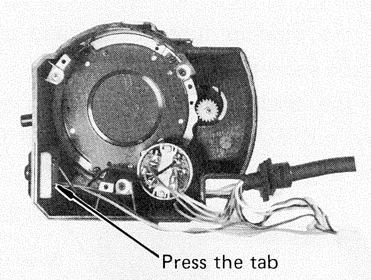

Press the tab

Fig. 3-5-8

- Unsolder the three wires from the ALC assembly and CN004. (Fig. 3-5-9)

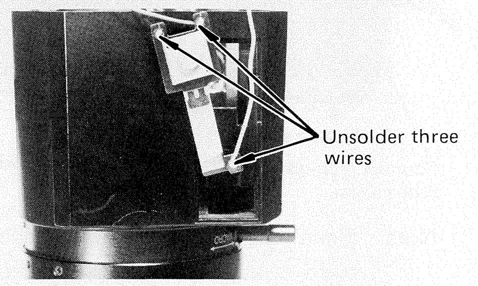

Unsolder three wires

Fig. 3-5-9

- Unsolder the five wires from the ALC assembly.
- Remove three screws which hold the ALC assembly and remove the ALC assembly. (Fig. 3-5-10)

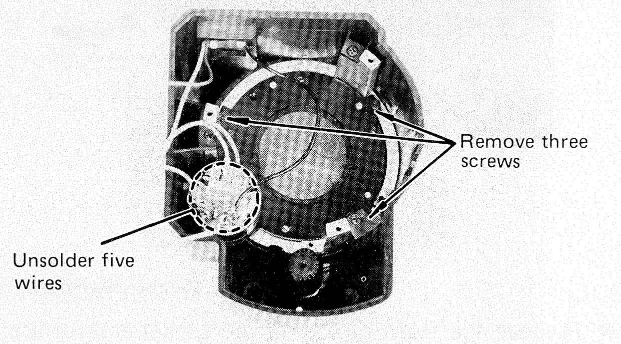

Remove three screws
Unsolder five wires

Fig. 3-5-10

- Remove three screws which hold the iris cover and remove the iris cover. (Fig. 3-5-11)

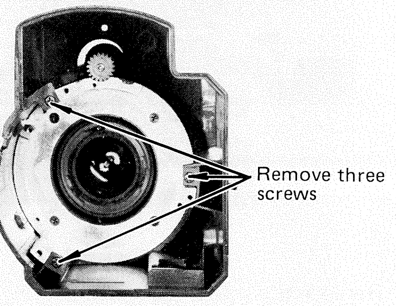

Remove three screws

Fig. 3-5-11

- Remove four screws which hold the iris cover supporter and remove the iris cover supporter. (Fig. 3-5-12)

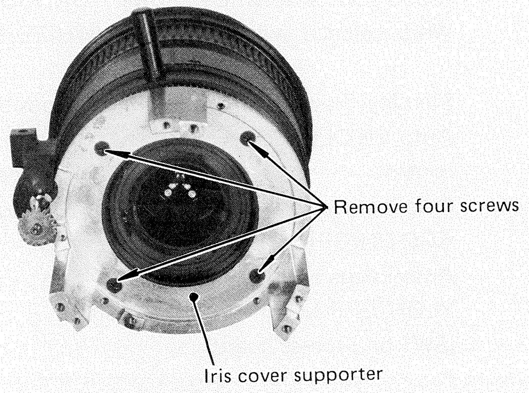

Remove four screws
Iris cover supporter

Fig. 3-5-12

- Remove two screws which hold the focus gear holder assembly remove the focus gear holder assembly and the focus gear assembly. (Fig. 3-5-13)

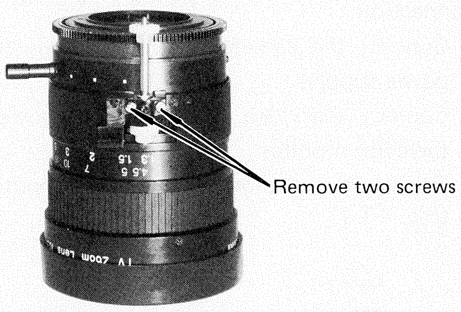
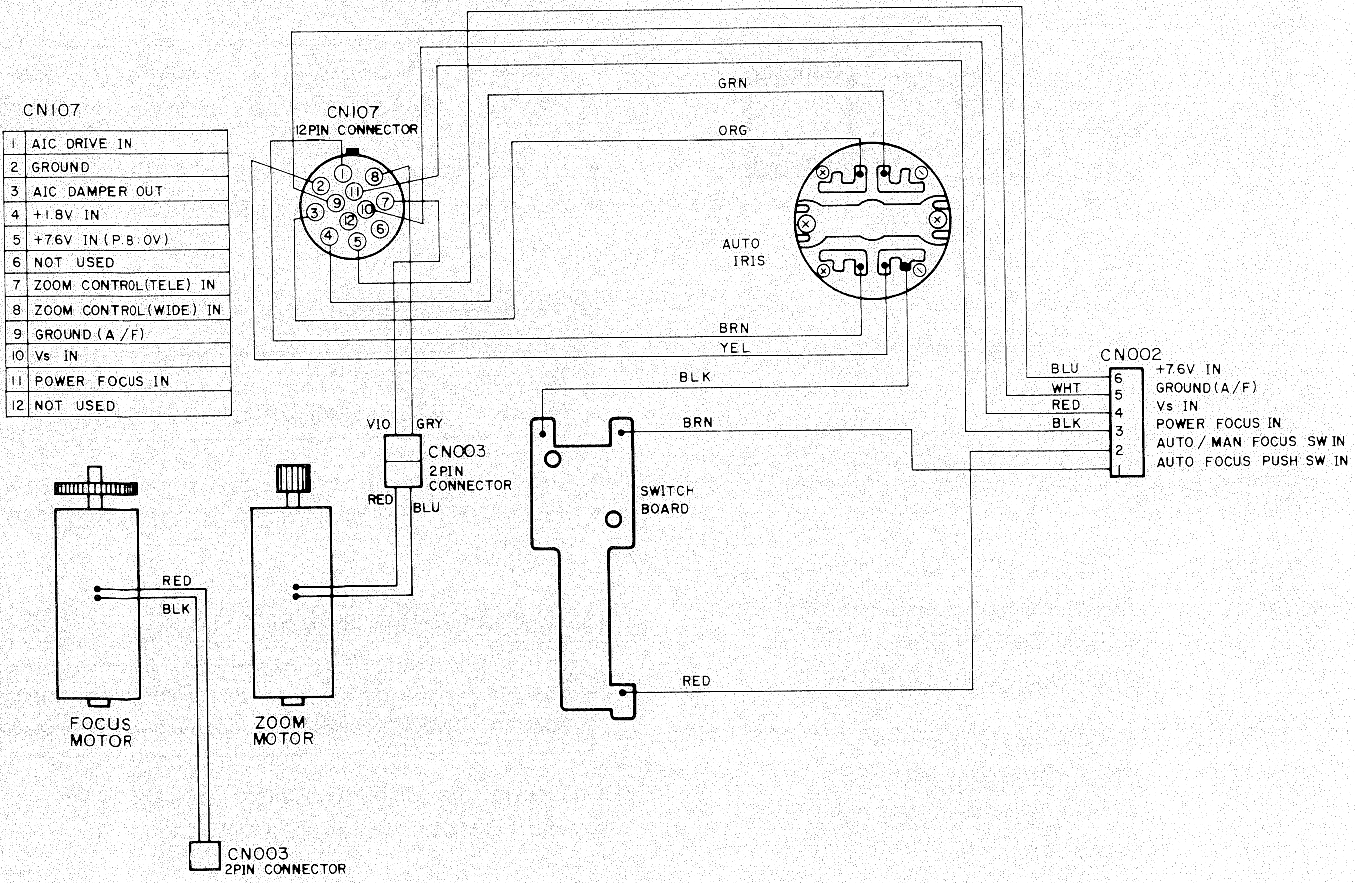

Remove two screws

Fig. 3-5-13

- After replacing the parts, reinstall the lens in reverse order of disassembly procedure.

Note : 1. When replacing the lens mounting assembly, clean the lens with lens cleaning tissue.
2. When replacing the auto focus lens circuit, refer to Fig. 3-5-14 for wiring.



CN107

1	AIC DRIVE IN
2	GROUND
3	AIC DAMPER OUT
4	+1.8V IN
5	+7.6V IN (P.B:0V)
6	NOT USED
7	ZOOM CONTROL (TELE) IN
8	ZOOM CONTROL (WIDE) IN
9	GROUND (A/F)
10	Vs IN
11	POWER FOCUS IN
12	NOT USED

CN107
12PIN CONNECTOR
1
2
3
4
5
6
7
8
9
10
11
12
GRN
ORG
AUTO
IRIS
BRN
YEL
BLK
BRN
RED
CN002
BLU
WHT
RED
BLK
6
5
4
3
2
+7.6V IN
GROUND (A/F)
Vs IN
POWER FOCUS IN
AUTO / MAN FOCUS SW IN
AUTO FOCUS PUSH SW IN
VIO
GRY
CN003
2PIN
CONNECTOR
RED
BLU
SWITCH
BOARD
RED
BLK
FOCUS
MOTOR
ZOOM
MOTOR
CN003
2PIN CONNECTOR

Fig. 3-5-14

4. ADJUSTMENT PROCEDURE

4-1 Connection and Setting Up for Adjustment

Connection

- Connect the camera cable from the camera to the power supply.
- Connect the video cable from the power supply to the color monitor.
- Terminate the color monitor video input in 75 ohm. (Fig. 4-1-1)

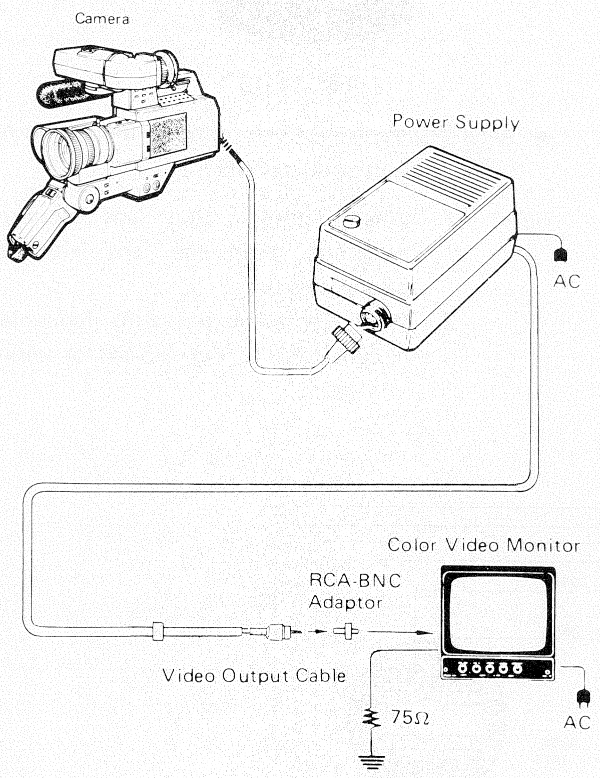


Fig. 4-1-1

Disassembling

- Disassemble the camera while referring to Section 2. "DISASSEMBLY PROCEDURE FOR ADJUSTMENT" on page 1.

Setting up

- Light : Incident light intensity on chart : 140 footcandles (1400 lux)
  Color temperature : 3200°K
- Test Charts : Logarithmic gray scale chart (YWV2310RB99)
  Color chart (YWV2100RB98)
  Flat white chart
  Ball/white set chart (YWV2100RB03)

Steps denoted by shaded outlines do not have to be performed if only pick-up tubes are replaced.

Position of controls and switches on the camera

Set the controls and switches on the camera as follows;

Indoor/Outdoor switch	Lower (INDOOR) position
White balance switch	Upper (WHITE BALANCE) position
Standby (Power) switch	Right (ON) position
Auto Iris CLOSE/OPEN control	Center (click) position
Color balance control	Center (click) position
AGC ON/OFF switch	OFF position
Auto Focus switch	OFF position
YL ON/OFF switch (SW1 on process board)	ON position

Note : TP in the manual refers to a test point on the printed circuit board.

4-2 Camera Unit Adjustment

- Refer to page 25 for the test points and adjusting controls.

Caution : Do not set the white balance during the adjustment.

(1) +7.6V adjustment

Test point :	TP4 (+7.6V)	Deflection board
Adjust :	VR1 (+7.6V ADJ)	Deflection board

- Connect the digital voltmeter to the +7.6V TP4.
- Adjust +7.6V ADJ VR1 for 7.6V ±0.01V.

(2) 3.58MHz adjustment

Test point :	Pin 5 of IC11	Process board
Adjust :	CT5 (3.58MHz ADJ)	Process board

- Connect the frequency counter to pin 5 of IC11.
- Adjust 3.58 MHz ADJ CT5 for 3,579,545.0 Hz ± 10.0 Hz.

(3) Horizontal hold adjustment

Test point :	TP6 (AFC)	Deflection board
Adjust :	VR12 (H.HOLD)	Deflection board

- Connect the digital voltmeter to AFC TP6.
- Adjust H.HOLD VR12 for 2.6V ±0.1V.

Steps denoted by shading need not be performed for pick-up tube replacement only.

(4) Target voltage adjustment

Test point :	TP5 (TARGET)	Deflection board
Adjust :	VR10 (TARGET)	Deflection board

- Connect the digital voltmeter to TARGET TP5.
- Adjust TARGET VR10 so that the voltage at TARGET TP5 is equal to "Esj + A" V. (See Note.).

Note : 1. The target voltage of pick-up tube should be adjusted while referring to Table 4-2-1.

Room Temperature	Target Voltage [Esj + A]
Less than 41°F (5°C)	Esj + 11.0 (V)
More than 41°F (5°C) to Less than 50°F (10°C)	Esj + 8.5 (V)
More than 50°F (10°C) to Less than 59°F (15°C)	Esj + 6.5 (V)
More than 59°F (15°C) to Less than 68°F (20°C)	Esj + 4.5 (V)
More than 68°F (20°C) to Less than 86°F (30°C)	Esj + 3.0 (V)
More than 86°F (30°C)	Esj + 1.0 (V)

Table 4-2-1

2. The value of optimum target voltage Esj is stamped on the pick-up tube neck. (Fig. 4-2-2)
In order to check the Esj value of pick-up tube, which already inserted into the coil assembly, the shield case should be removed by unscrewing the two screws. (Fig. 4-2-3)

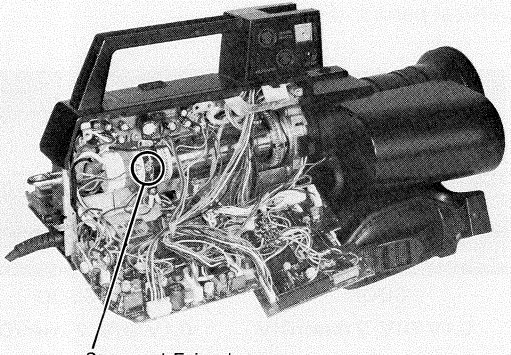


Fig. 4-2-2

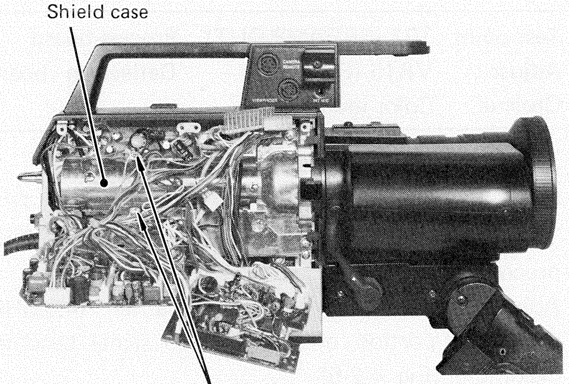
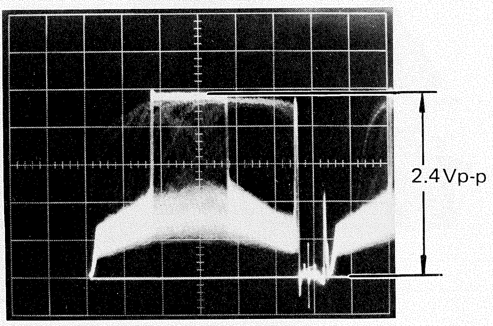


Fig. 4-2-3

(5) Beam current adjustment

Test point :	TP1 (PREAMP OUT)	Process board
Adjust :	VR14 (BEAM)	Deflection board

- Connect the oscilloscope to PREAMP OUT TP1.
- Trigger the oscilloscope at H.rate. (Use Hs TP9 on process board.)
- Aim the camera at the scene which contains a high intensity object and turn the Auto Iris Close/Open control on the right bottom cover of the camera to Open position.
- Adjust BEAM VR14 until the waveform is clipped at 2.4V±0.1Vp-p. (Fig. 4-2-4) If the signal does not increase up to 2.4 Vp-p, aim the camera at a brighter object.
- Reset the Auto Iris Close/Open control to Center position.



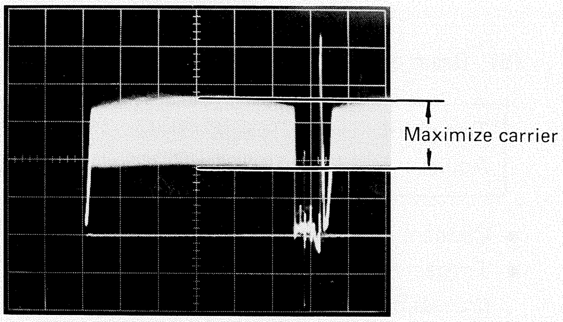
0.5V/DIV, 10μsec/DIV

Fig. 4-2-4

(6) Focus coarse adjustment

Test point :	TP1 (PREAMP OUT)	Process board
Adjust :	VR15 (FOCUS)	Deflection board
Observe :	Color monitor	

- Aim the camera at white chart.
- Connect the oscilloscope to PREAMP OUT TP1.
- Trigger the oscilloscope at H.rate. (Use Hs TP9 on process board)
- Adjust FOCUS VR15 so that the carrier (4.3MHz) on center portion of the prevideo signal becomes maximum. (Fig. 4-2-5)
- Make sure that the minimum green color on the center portion of monitor screen.



0.5V/DIV, 10μsec/DIV

Fig. 4-2-5

(7) Backfocus adjustment

Adjust :	Backfocus adjusting ring
Observe :	Color monitor

- Remove two screws and unsolder two points holding the shield plate for backfocus adjusting ring and remove the shield plate. (Fig. 4-2-6)

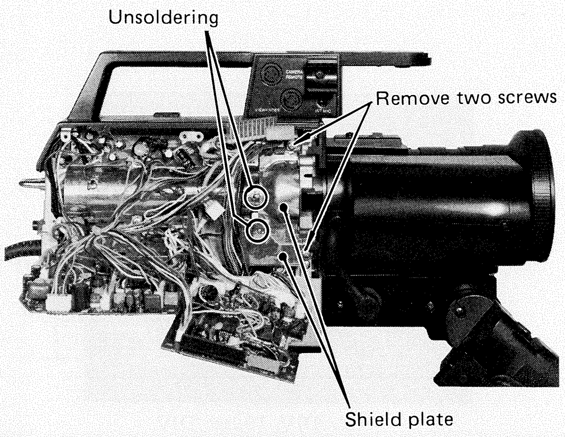


Fig. 4-2-6

- Aim the camera at the dark object further than 6 feet (2m) from the camera.
- Turn the Auto Iris Close/Open control to the Open position.
- Zoom in (close up/telephoto) and adjust the focus by turning the lens focus.
- Zoom out (Wide angle) and adjust the focus by turning the backfocus adjusting ring. (Fig. 4-2-7)
- Zoom in again and adjust the focus by turning the lens focus.
- Zoom out again and adjust the focus by turning the backfocus adjusting ring.
- Repeat this procedure until the focus tracks throughout the zoom range.
- Reset the Auto Iris Close/Open control to the center position.
- Replace the shield plate of backfocus adjust ring, then attach to the chassis with two screws and solder the two points.

  Note : Turn off the power switch on the power supply unit whenever remove or replace the shield plate.

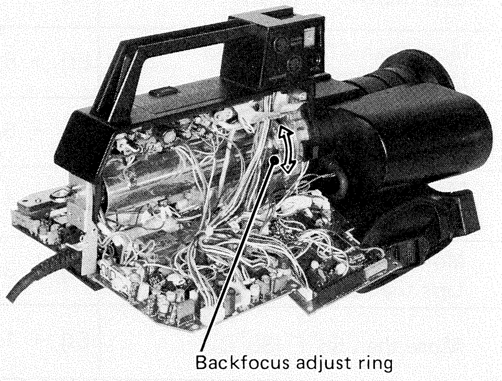
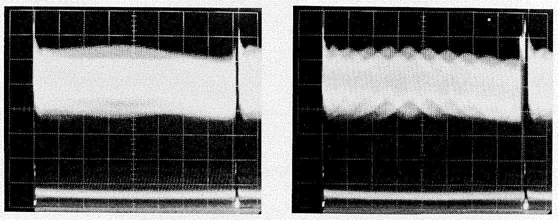


Fig. 4-2-7

(8) Vertical size and vertical centering adjustment

Test point :	TP1 (PREAMP OUT)	Process board
Adjusts :	VR5 (V.SIZE)	Deflection board
	VR6 (V.CENT)	Deflection board

- Aim the camera at the white chart.
- Connect the oscilloscope to PREAMP OUT TP1.
- Trigger the oscilloscope at V.rate. (Use Vs TP8 on deflection board.)
- Adjust V. SIZE VR5 for minimum beat during the vertical period. (Fig. 4-2-8)



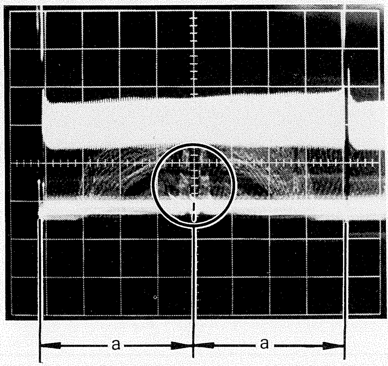
GOOD
0.1V/DIV, 2 msec/DIV

NO GOOD
0.1V/DIV, 2 msec/DIV

Fig. 4-2-8

- Turn H.CENT VR4 on deflection board fully counterclockwise.
- Turn H.SIZE VR2 on deflection board fully clockwise.

  The optical black and arrow maker appear on the oscilloscope.
- While observing the waveform, adjust V.CENT VR6 so that the marker which shows the vertical center of pick-up tube positions at the center of video signal waveform in vertical rate. (Fig. 4-2-9)



0.2V/DIV, 2msec/DIV

Fig. 4-2-9

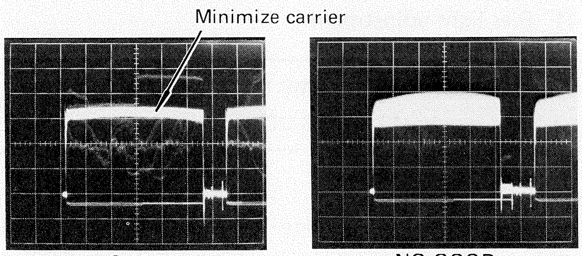
Note : When adjust the vertical centering using with the underscanning monitor, adjust V.CENT VR6 so that the arrow marker shows the vertical center of the monitor.

- Turn back H.SIZE VR2 to its mechanical center and H.CENT VR4 until the optical black and arrow marker disappear.

(9) Horizontal size and horizontal linearity adjustment

Test point :	TP3 (YH)	Process board
Adjusts :	VR2 (H.SIZE)	Deflection board
	VR3 (H.LIN-2)	Deflection board
	VL5 (H.LIN-1)	Deflection board

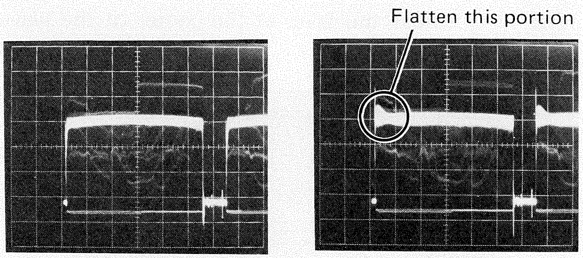
- Aim the camera at white chart.
- Connect the oscilloscope to YH TP3.
- Trigger the oscilloscope at H.rate. (Use Hs TP9 on process board)
- Adjust H.SIZE VR2 so that the carrier (4.3MHz) on the center portion of the YH signal at YH TP3 is minimum. (Fig. 4-2-10)
- Adjust H.LIN-2 VR3 so that the starting portion of YH signal at YH TP3 is flat. (Fig. 4-2-11)
- Adjust H.LIN-1 VL5 so that the carrier (4.3MHz) on the YH signal is minimum.
- Repeat adjusting H.SIZE VR2, H.LIN-2 VR3 and H.LIN-1 VL5 until the carrier on the YH signal is minimum, the starting portion of YH signal is flat and picture has minimum disturbance on the left side.



GOOD
0.1V/DIV, 10μsec/DIV

NO GOOD
0.1V/DIV, 10μsec/DIV

Fig. 4-2-10



GOOD
0.1V/DIV, 10μsec/DIV

NO GOOD
0.1V/DIV, 10μsec/DIV

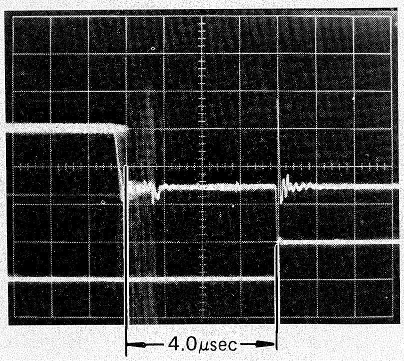
Fig. 4-2-11

(10) Horizontal centering adjustment

Test points :	TP1 (PREAMP OUT)	Process board
	TP9 (Hs)	Process board
Adjust :	VR4 (H.CENT)	Deflection board

- Aim the camera at the white chart.
- Connect the oscilloscope to PREAMP OUT TP1 and Hs TP9.
- Trigger the oscilloscope at H.rate. (Use Hs TP9 on process board.)
- Expand the horizontal blanking period on the oscilloscope.
- Adjust H.CENT VR4 until the optical black width is 4.0 μsec ± 0.1 μsec. (Fig. 4-2-12)

  If the falling edge of the waveform corresponding to the picture is noisy, adjust for the middle.



1μsec/DIV

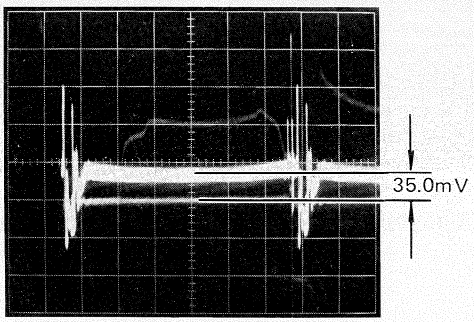
Fig. 4-2-12

(11) Bias light adjustment

Test point :	TP1 (PREAMP OUT)	Process board
Adjust :	VR13 (BIAS LIGHT)	Deflection board

- Cap on the lens.
- Connect the oscilloscope to PREAMP OUT TP1.
- Trigger the oscilloscope at H.rate. (Use Hs TP9 on process board.)
- Adjust BIAS LIGHT VR13 so that the bias current is 35mV ±5mV. (Fig. 4-2-13)

  Note : If there is bias light (current) shading, adjust the level at the center of the waveform.



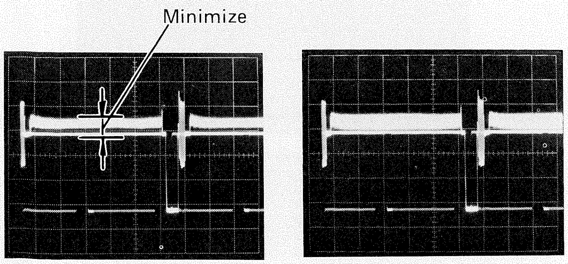
50mV/DIV, 10μsec/DIV

Fig. 4-2-13

(12) Bias light shading (Bs) correction adjustment

Test point :	TP5 (VIDEO)	Process board
Adjusts :	VR9 (Bs V.SAW)	Deflection board
	VR8 (Bs V.PARA)	Deflection board
	VR7 (Y PED)	Deflection board

- Set the AGC switch on the right side of the grip arm to ON position.
- Cap on the lens.
- Connect the oscilloscope to VIDEO TP5.
- Trigger the oscilloscope at H.rate. (Use Hs TP9 on process board.)
- Turn Y PED VR7 fully clockwise.
- Adjust Bs V.PARA VR8 and Bs V.SAW VR9 so that the top portion of dark signal waveform becomes as narrow as possible. (Fig. 4-2-14)



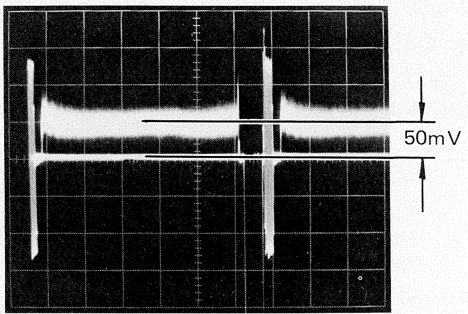
GOOD
0.1V/DIV, 10μsec/DIV

NO GOOD
0.1V/DIV, 10μsec/DIV

Fig. 4-2-14

Steps denoted by shading need not be performed for pick-up tube replacement only.

- Adjust Y PED VR7 so that the pedestal level at VIDEO TP5 becomes 50mV. (Fig. 4-2-15)
- Confirm that the pedestal level does not change by operating AGC switch ON/OFF. If changed, readjust Y PED VR7 so that the pedestal level does not change by operating AGC switch ON/OFF.



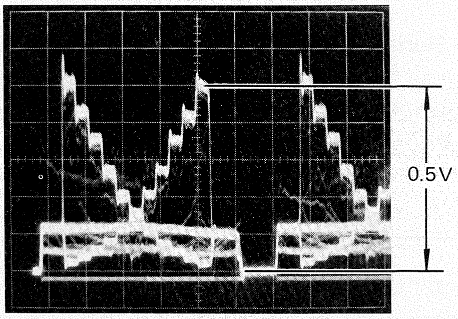
50mV/DIV, 10μsec/DIV

Fig. 4-2-15

(13) AIC level adjustment

Test point :	TP2 (TRACKING)	Process board
Adjust :	VR3 (AIC SET)	Process board

- Aim the camera at the logarithmic gray scale chart.
- Connect the oscilloscope to TRACKING TP2.
- Trigger the oscilloscope at H.rate. (Use Hs TP9 on process board.)
- Adjust AIC SET VR3 so that the waveform is 0.5V ± 0.02V from the blanking level to the top step of the gray scale waveform. (Fig. 4-2-16)



0.1V/DIV, 10μsec/DIV

Fig. 4-2-16

(14) AGC/MANUAL gain adjustment

Test point :	TP3 (YH)	Process board
Adjusts :	VR1 (MANUAL GAIN)	Process board
	VR2 (AGC SET)	Process board

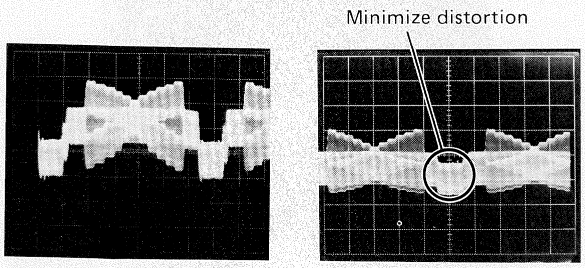
- Aim the camera at the gray scale chart.
- Set the AGC switch to ON position.
- Connect the oscilloscope to YH TP3.
- Trigger the oscilloscope at H.rate. (Use Hs TP9 on process board.)

- Adjust AGC SET VR2 for 0.4V ± 0.02V from the blanking level to the top step of the gray scale waveform.
- Change the AGC switch to OFF position.
- Adjust MANUAL GAIN VR1 for 0.4V ±0.02V from the blanking level to the top step of the gray scale waveform.
- Confirm that the waveform does not change by operating AGC switch ON/OFF. If change readjust MANUAL GAIN VR1 and AGC SET VR2 so that the waveform does not change by operating AGC switch ON/OFF and its level is 0.4V ± 0.02V.

(15) Vertical edge balance and vertical edge bias adjustment

Test points :	TP4 (V EDGE)	Process board
	TP11 (1H VIDEO)	Process board
Adjusts :	VR16 (V.EDGE BIAS)	Process board
	VR18 (V.EDGE BALANCE)	Process board

- Aim the camera at the logarithmic gray scale chart.
- Connect the oscilloscope to 1H VIDEO TP11.
- Trigger the oscilloscope at H.rate. (Use Hs TP9 on process board.)
- Turn V.EDGE BIAS VR16 fully counterclockwise.
- Turn back V.EDGE BIAS VR16 slowly and stop it at the point where the distortion of the H.BL signal becomes minimum. (Fig. 4-2-17)

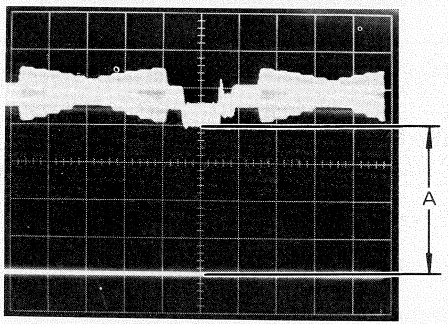


GOOD
0.2V/DIV, 10μsec/DIV

NO GOOD
0.2V/DIV, 10μsec/DIV

Fig. 4-2-17

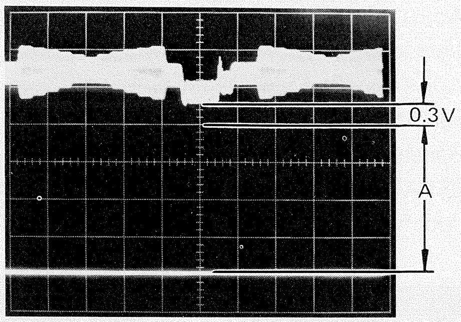
- Set the oscilloscope input coupling selector to DC position.
- Note the DC level of the H.BL portion as (A). (Fig. 4-2-18)



0.5V/DIV, 10μsec/DIV

Fig. 4-2-18

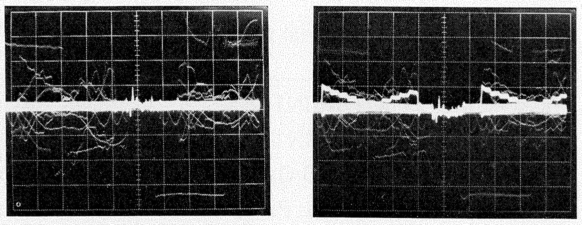
- Adjust V.EDGE BIAS VR16 so that the H.BL DC level becomes (A) +0.3V. (Fig. 4-2-19)



0.5V/DIV, 10μsec/DIV

Fig. 4-2-19

- Reset the oscilloscope input coupling selector to AC position.
- Connect the oscilloscope to V.EDGE TP4.
- Adjust V.EDGE BALANCE VR18 to cancel the video signal. (Fig. 4-2-20)



GOOD
0.2V/DIV, 10μsec/DIV

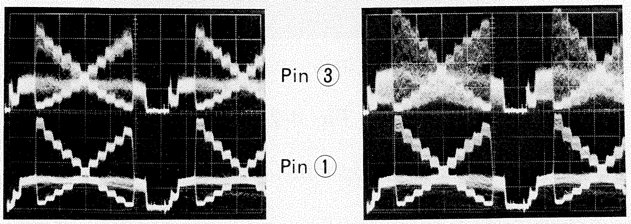
NO GOOD
0.2V/DIV, 10μsec/DIV

Fig. 4-2-20

(16) R and B signal separation adjustment

Test points :	Pin 1 of CN1 (R) Pin 3 of CN1 (B)	Process board
Adjusts :	CT2 (R/B SEPARATION-1)	Process board
	VR5 (R/B SEPARATION-2)	Process board

- Set the AGC switch to ON position.
- Set the YL ON/OFF switch (SW1) on process board to OFF position.
- Aim the camera at the logarithmic gray scale chart.
- Connect oscilloscope to pin 1 and pin 3 of CN1.
- Trigger the oscilloscope at H.rate. (Use Hs TP9 on process board.)
- Adjust R/B SEPARATION-1 CT2 for minimum waveform flicker. (Fig. 4-2-21)
- Adjust R/B SEPARATION-2 VR5 for the same condition.
- Repeat adjusting R/B SEPARATION-1 CT2 and R/B SEPARATION-2 VR5 until the flicker in waveform is minimum.



GOOD
0.1V/DIV, 10μsec/DIV

NO GOOD
0.1V/DIV, 10μsec/DIV

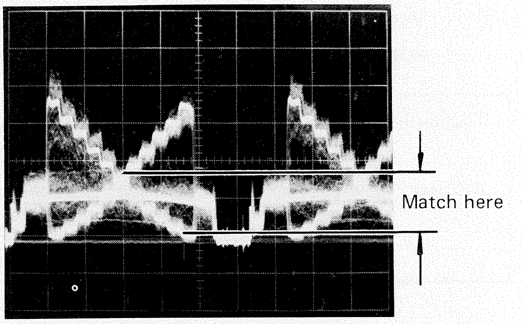
Fig. 4-2-21

(17) B gain and YL pedestal preset adjustment

Test points :	Pin 3 of CN1 (B)	Process board
	Pin 2 of CN1 (YL)	Process board
Adjusts :	VR4 (R/B GAIN)	Process board
	VR15 (YL PED)	Process board

- Set the AGC switch to ON position.
- Set the YL ON/OFF switch to OFF position.
- Aim the camera at the logarithmic gray scale chart.
- Connect the oscilloscope to pin 2 and pin 3 of CN1.
- Trigger the oscilloscope at H.rate. (Use Hs TP9 on process board.)
- Set the Color balance Red/Blue control on right bottom cover to center (click) position.
- Turn B TRACKING-1 VR7, B TRACKING-2 VR6, B TRACKING-3 VR8, R TRACKING-1 VR10, R TRACKING-2 VR11 and R TRACKING-3 VR9 on process board to their mechanical center.

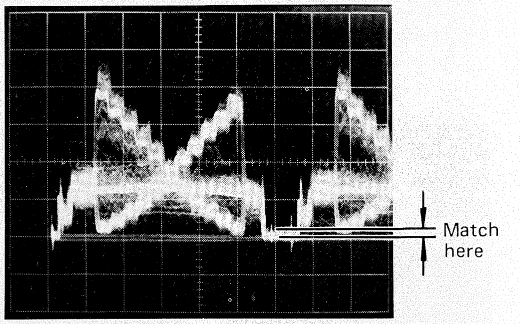
  Note : Before adjusting R/B GAIN VR4, if the gray scales black chip of YL signal is suppressed, turn YL PED VR15 until the black chip of YL signal can be observed.
- Overlay the B signal and YL signal on the oscilloscope, and adjust R/B GAIN VR4 so that the signal level between the black chip (zero step) and fifth step (crossing step) of gray scale waveform match. (Fig. 4-2-22)



0.1V/DIV, 10μsec/DIV

Fig. 4-2-22

- Next adjust YL PED VR15 so that the pedestal level of YL signal matches that of B signal. (Fig. 4-2-23)



0.1V/DIV, 10μsec/DIV

Fig. 4-2-23

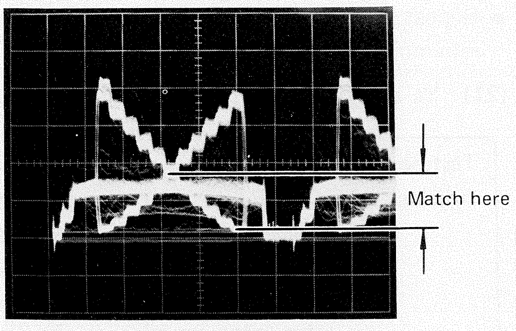
(18) R gain and R pedestal preset adjustment

Test points :	Pin 1 of CN1 (R)	Process board
	Pin 2 of CN1 (YL)	Process board
Adjusts :	VR12 (R GAIN)	Process board
	VR13 (R PED)	Process board

- Set the AGC switch to ON position.
- Set the YL ON/OFF switch to OFF position.
- Aim the camera at the logarithmic gray scale chart.

- Connect the oscilloscope to Pin 2 and Pin 1 of CN1.
- Trigger the oscilloscope at H.rate. (Use Hs TP9 on process board.)

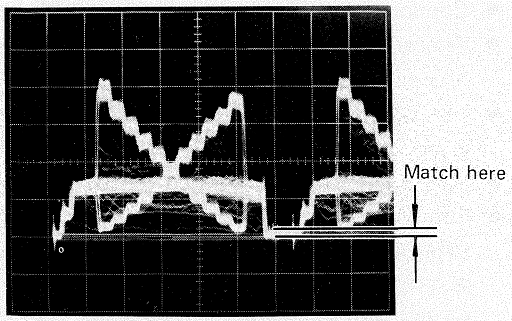
  Note : Before adjusting R GAIN VR12, if the gray scales black chip of R signal is suppressed, turn R PED VR13 until the black chip of R signal can be observed.
- Overlay the R signal and YL signal on the oscilloscope, and adjust R GAIN VR12 so that the signal level between the black chip (zero step) and fifth step (crossing step) of gray scale waveform match. (Fig. 4-2-24)



0.1V/DIV, 10μsec/DIV

Fig. 4-2-24

- Next adjust R PED VR13 so that the pedestal level of R signal matches that of YL signal. (Fig. 4-2-25)



0.1V/DIV, 10μsec/DIV

Fig. 4-2-25

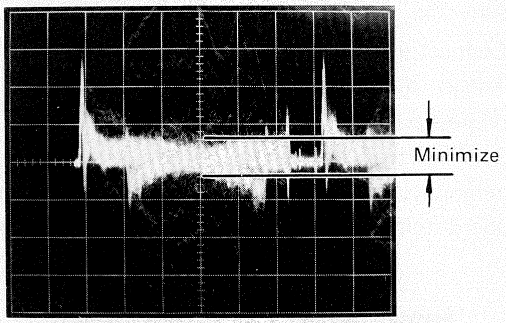
- Repeat adjusting R GAIN VR12 and R PED VR13 until the signal level between the black chip (zero step) and fifth step (crossing step), and pedestal level of gray scale waveform match.

(19) YL and B signal tracking adjustment

Test point :	Pin 3 of CN1 (B)	Process board
Adjusts :	VR7 (B TRACKING-1)	Process board
	VR6 (B TRACKING-2)	Process board
	VR8 (B TRACKING-3)	Process board
	VR4 (R/B GAIN)	Process board

- Set the YL ON/OFF switch to ON position.
- Confirm that the B TRACKING-1 VR7, B TRACKING-2 VR6 and B TRACKING-3 VR8 are set to their mechanical center.
- Aim the camera at the logarithmic gray scale chart.
- Connect the oscilloscope to Pin 3 of CN1.
- Trigger the oscilloscope at H.rate. (Use Hs TP9 on process board.)
- Confirm that the center portion of B-YL signal is minimum.

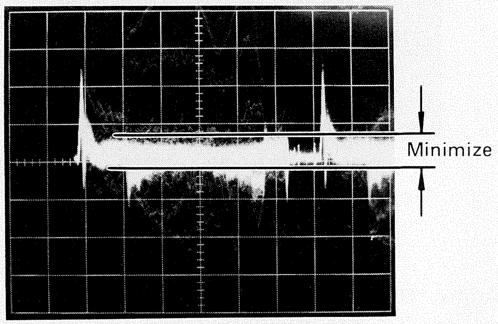
  If not adjust R/B GAIN VR4 on process board to minimize. (Fig. 4-2-26)



0.1V/DIV, 10μsec/DIV

Fig. 4-2-26

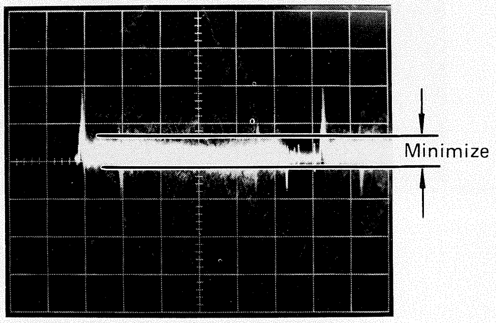
- Adjust B TRACKING-1 VR7 so that the B-YL signal becomes minimum. (Fig. 4-2-27)



0.1V/DIV, 10μsec/DIV

Fig. 4-2-27

- Adjust B TRACKING-2 VR6 and B TRACKING-3 VR8 so that the B-YL signal becomes minimum. (Fig. 4-2-28)



0.1V/DIV, 10μsec/DIV

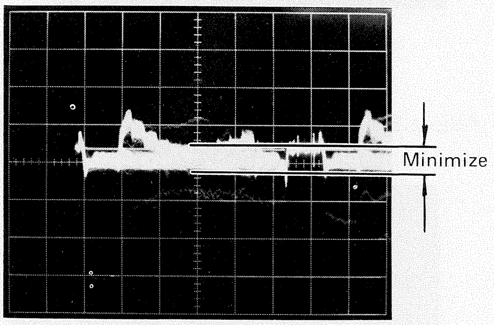
Fig. 4-2-28

- Repeat these steps until the B-YL signal becomes minimum.

(20) YL and R signal tracking adjustment

Test point :	Pin 1 of CN1 (R)	Process board
Adjusts :	VR10 (R TRACKING-1)	Process board
	VR11 (R TRACKING-2)	Process board
	VR9 (R TRACKING-3)	Process board
	VR12 (R GAIN)	Process board

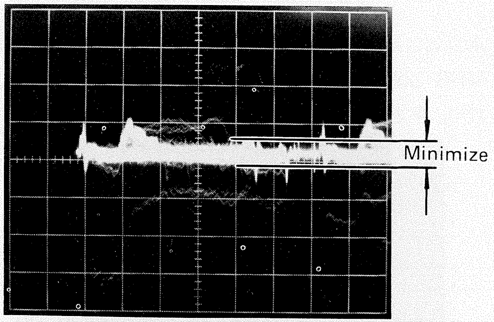
- Set the YL ON/OFF switch to ON position.
- Confirm that the R TRACKING-1 VR10, R TRACKING-2 VR11 and R TRACKING-3 VR9 are set to their mechanical center.
- Aim the camera at logarithmic gray scale chart.
- Connect the oscilloscope Pin 1 of CN1.
- Trigger the oscilloscope at H.rate. (Use Hs TP9 on process board.)
- Confirm that the center portion of R-YL signal is minimum. If not, adjust R GAIN VR12 on process board to minimize. (Fig. 4-2-29)



0.1V/DIV, 10μsec/DIV

Fig. 4-2-29

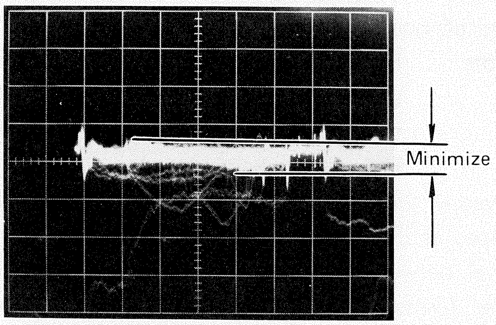
- Adjust R TRACKING-1 VR10 so that R-YL signal becomes minimum. (Fig. 4-2-30)



0.1V/DIV, 10μsec/DIV

Fig. 4-2-30

- Adjust R TRACKING-2 VR11 and R TRACKING-3 VR9 so that the R-YL signal becomes minimum. (Fig. 4-2-31)



0.1V/DIV, 10μsec/DIV

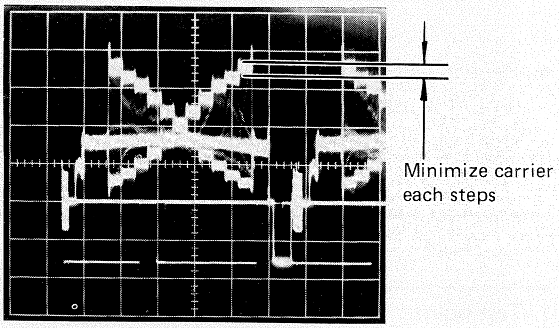
Fig. 4-2-31

- Repeat these steps until the R-YL signal becomes minimum.

(21) YL and R/B signal tracking fine adjustment

Test point :	TP5 (VIDEO)	Process board
Adjusts :	VR4 (R/B GAIN)	Process board
	VR12 (R GAIN)	Process board
	VR7 (B TRACKING-1)	Process board
	VR6 (B TRACKING-2)	Process board
	VR8 (B TRACKING-3)	Process board
	VR10 (R TRACKING-1)	Process board
	VR11 (R TRACKING-2)	Process board
	VR9 (R TRACKING-3)	Process board

- Set the YL ON/OFF switch to ON position.
- Aim the camera at the logarithmic gray scale chart.
- Connect the oscilloscope to VIDEO TP5.
- Trigger the oscilloscope at H.rate. (Use Hs TP9 on process board.)
- Fine adjust R/B GAIN VR4 so that the carrier on the video output at VIDEO TP5 becomes minimum.
- Fine adjust R GAIN VR12 for the same condition.
- Fine adjust B TRACKING-1 VR7, B TRACKING-2 VR6, B TRACKING-3 VR8, R TRACKING-1 VR10, R TRACKING-2 VR11 and R TRACKING-3 VR9 for the same condition. (FIg. 4-2-32)



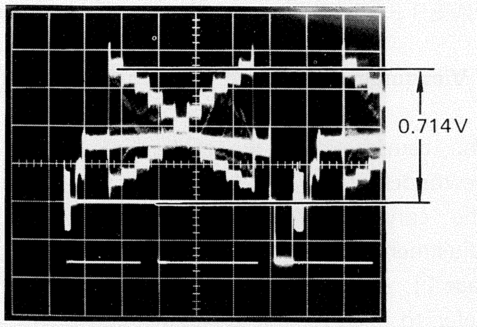
0.2V/DIV, 10μsec/DIV

Fig. 4-2-32

(22) Y gain adjustment

Test point :	TP5 (VIDEO)	Process board
Adjust :	VR14 (Y GAIN)	Process board

- Aim the camera at the logarithmic gray scale chart.
- Connect the oscilloscope to VIDEO TP5.
- Trigger the oscilloscope at H.rate. (Use Hs TP9 on process board.)
- Adjust Y GAIN VR14 for 0.714V ± 0.05V from the blanking level to the top step of the gray scale waveform. (Fig. 4-2-33)



0.2V/DIV, 10μsec/DIV

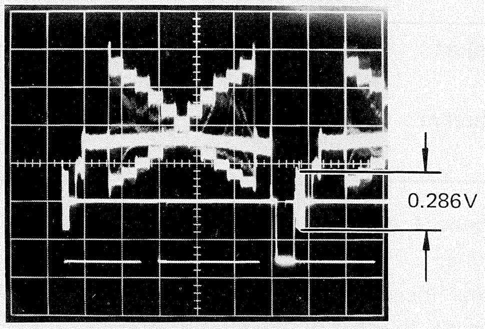
Fig. 4-2-33

(23) Chroma phase, Chroma gain and burst level adjustment

Test point :	TP5 (VIDEO)	Process board
Adjusts :	CT4 (CHROMA PHASE)	Process board
	VR17 (CHROMA GAIN)	Process board
	VR19 (BURST LEVEL)	Process board
Observe :	Vectorscope	

- Aim the camera at the logarithmic gray scale chart.
- Connect the oscilloscope to VIDEO TP5.
- Trigger the oscilloscope at H.rate. (Use Hs TP9 on process board.)
- Connect the video output to a terminated vectorscope.
- Adjust BURST LEVEL VR19 so that the burst level is 0.286V ± 0.01V on the oscilloscope (Fig. 4-2-34) and confirm that the burst level is 75% on the vectorscope. (Fig. 4-2-35)
- Aim the camera at the color chart.
- Adjust CHROMA PHASE CT4 so that the red vector becomes 104° ± 8° on the vectorscope. (Fig. 4-2-35)
- Adjust CHROMA GAIN VR17 so that the red vector becomes 175% as compares to the burst signal on the vectorscope. (Fig. 4-2-35)

Steps denoted by shading need not be performed for pick-up tube replacement only.



0.2V/DIV, 10μsec/DIV

Fig. 4-2-34

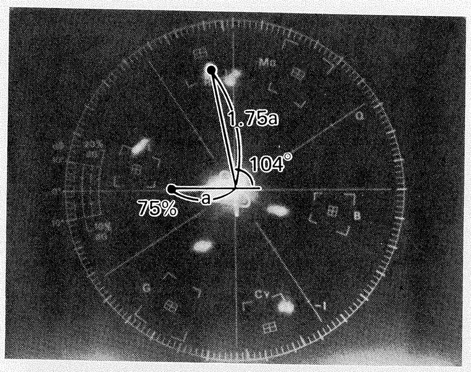


Fig. 4-2-35

(24) YL phase adjustment

Adjust :	CT3 (YL PHASE)	Process board
Observe :	Color monitor	

- Aim the camera at white set chart. (The reverse side of ball chart.)
- Adjust YL PHASE CT3 for minimum color on the right side edge of white portion. (Fig. 4-2-36)

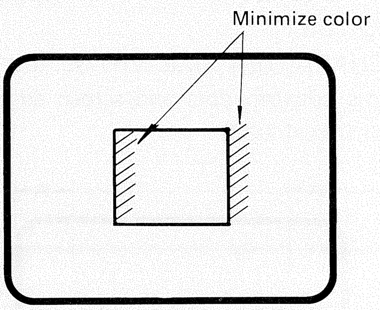


Fig. 4-2-36

Steps denoted by shading need not be performed for pick-up tube replacement only.

(25) Title color phase adjustment

Adjust : CT1 (TITLE COLOR PHASE) Process board
Observe : Color monitor
Vectorscope

- Connect the video output to a terminated vectorscope.
- Press the TITLE button on the key board (B) to observe the dots on the monitor screen.
- Repeat to press the TITLE CLR button on the key board (B) until title color becomes red on the monitor screen.
- Press the KEY button on the key board (B) for red key picture on the monitor screen.
- Adjust TITLE COLOR PHASE CT1 so that the red vector becomes 104° on the vectorscope. (Fig. 4-2-37)

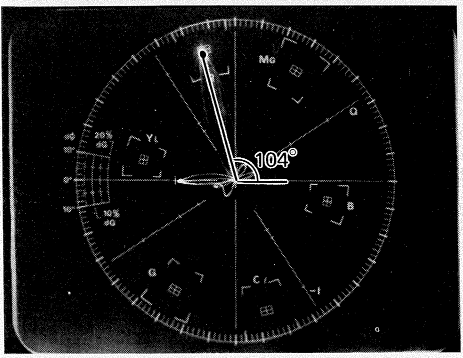


Fig. 4-2-37

(26) Character size adjustment

Adjust : VR1 (CHARACTER SIZE) Micro processor board
Observe : Color monitor

- Press the TITLE button to observe the dot on the monitor screen.
- Press the WORD L/S button on the key board (B) to select large dots.
- Adjust CHARACTER SIZE VR1 so that the both side spaces between dots and screen edges become equal (A). (Fig. 4-2-38)

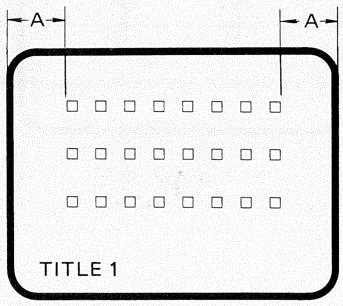


Fig. 4-2-38

(27) Timer frequency adjustment

Test point : TP1 (TIMER FREQ) Micro processor board
Adjust : CT1 (TIMER FREQ) Micro processor board

- Turn OFF the power.
- Insert the specified battery (SUM-3, AM-3 or AA size) into backup battery compartment.
- Connect the frequency counter to TIMER FREQ TP1 on Micro processor board.
- Adjust TIMER FREQ CT1 so that the frequency at TIMER FREQ TP1 is 32,768.00(Hz).

4-3 Viewfinder adjustment

- The camera must be completely aligned before viewfinder adjustment is made.
- The conditions and connections for viewfinder adjustment are the same as shown in Fig. 4-1-1 on page 11.
- Refer to page 27 for the adjusting controls and test points.

(1) Picture tilt adjustment

Adjust : Deflection coil
Observe : Viewfinder

- Reduce picture size using EVF V.SIZE VR11 on deflection board and H.SIZE VL3 on EVF board.
- Loosen the deflection coil holding screw. (Fig. 4-3-1)

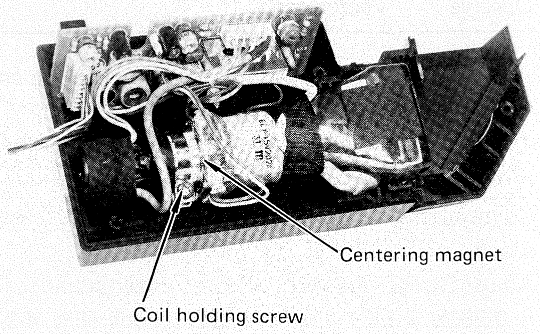


Fig. 4-3-1

- Cap on the lens.
- Observe the viewfinder, and turn the deflection coil until the raster is straight.
- Tighten the deflection coil holding screw.

(2) Centering magnets adjustment

Adjust : Centering magnets
Observe : Viewfinder

- Aim the camera at the ball chart.
- Adjust the centering magnets (See Fig. 4-3-1) until the center of picture (raster) becomes to the center of the viewfinder screen. (Fig. 4-3-2)

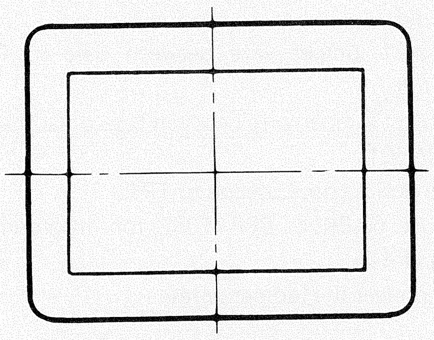


Fig. 4-3-2

(3) EVF V.SIZE and H.SIZE adjustment

Adjusts : VR11 (EVF V.SIZE) Deflection board
VL3 (H.SIZE) EVF board
Observe : Viewfinder

- Aim the camera at the ball chart, and line up the reference arrow head with edge of the raster (blanking) on the viewfinder. (Fig. 4-3-3)
- Adjust H.SIZE VL3 to a point where the ball charts edges just disappear on the viewfinder. (Fig. 4-3-3)
- Then adjust EVF V.SIZE VR11 so that the circle in the chart is nearly a true circle.

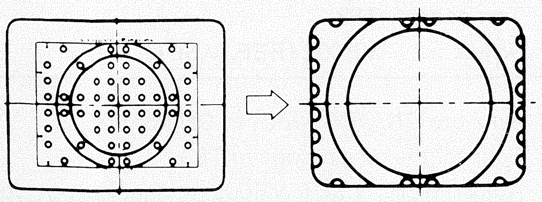


Fig. 4-3-3

Steps denoted by shading need not be performed for pick-up tube replacement only.

(4) Contrast and brightness adjustment

Adjusts : VR2 (BRIGHT) EVF board
VR3 (CONTRAST) EVF board
Observe : Viewfinder

- Aim the camera at the rogarithmic gray scale chart.
- Adjust BRIGHT VR2 and CONTRAST VR3 so that the black and white chip gradations will be the same on the viewfinder screen as that in the monitor.

(5) Focus adjustment

Adjust : VR1 (FOCUS) EVF board
Observe : Viewfinder

- Aim the camera at ball chart.
- Adjust FOCUS VR1 for best resolution in the viewfinder.

Steps denoted by shading need not be performed for pick-up tube replacement only.

4-4 Auto Focus Lens Adjustment

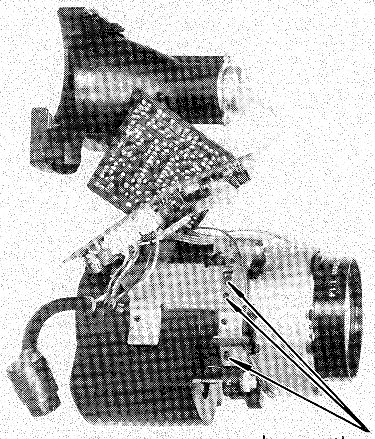
- Disassemble the lens as described in Section 2 DISASSEMBLY PROCEDURE FOR ADJUSTMENT on page 1.
- Connect the lens connector to the connector on the connector board of the camera.
- Adjust the auto focus lens using with completely adjusted camera.
- Refer to page 27 for the adjusting controls and test points.

(1) Focus ring position sensor adjustment

Adjust : Position sensor
Observe : Pin 1 to Pin 7 of CN004

- Set Auto ON/OFF switch SW001 to OFF position.
- Turn the lens focus to minimum distance 3.8ft (1.3m) position.
- Loosen three screws holding lens position sensor and bring down the position sensor to lowest position. (Fig. 4-4-1)
- Bring up the position sensor slowly while observing each potential of CN004 and stop it at the point where the each potential at pin 1, pin 2, pin 3, pin 4, pin 5, pin 6 and pin 7 of CN004 are H, L, H, H, L, H and L respectively.
- Tighten three screws.

  Note : Do not loosen three screws holding position sensor, when adjusting only the electrical circuit of auto focus lens.



Loosen three screws when adjusting the lens position sensor

Fig. 4-4-1

(2) 63.8KHz adjustment

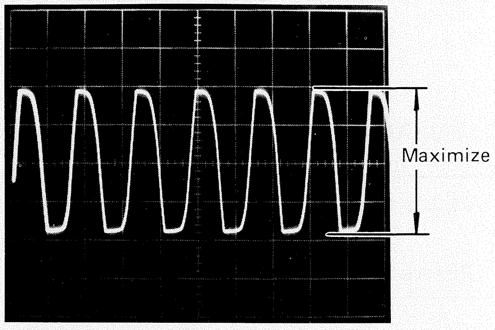
Test point : Base of Q005
Adjust : VR003 (63.8KHz ADJ)

- Set Auto ON/OFF switch to ON position.
- Connect jumper wire between base of Q009 and ground
- Connect the frequency counter to base of Q005.
- Adjust VR003 for 63.8kHz ± 0.2kHz.
- Disconnect jumper wire from base of Q009.

(3) 63.8KHz BPF adjustment

Test point : TP1
Adjust : T002 (63.8KHz BPF)

- Set Auto ON/OFF switch to ON position.
- Connect jumper wire between base of Q009 and ground.
- Connect jumper wire between base of Q004 and ground.
- Connect jumper wire between base of Q005 and pin 1 of CN001.
- Connect the oscilloscope to TP1.
- Adjust 63.8KHz BPF T002 for maximum output. (Fig. 4-4-2)
- Disconnect the jumper wires.



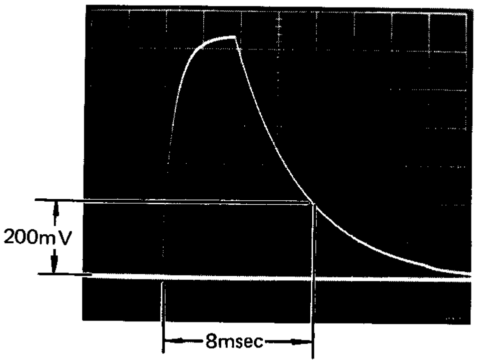
2V/DIV, 10μsec/DIV

Fig. 4-4-2

(4) REF. V.set adjustment

Test point : TP3
Adjust : VR002 (REF. V.SET)

- Set Auto ON/OFF switch to ON position.
- Connect the oscilloscope to TP3.
- Adjust REF. V.SET VR002 so that output voltage becomes 200mV after 8msec at 77°F from trigger point. (Fig. 4-4-3)
- Select timing (msec) which is shown at the vertical graduation through the temperature graduation and crosspoint in Fig. 4-4-4.



100mV/DIV, 2msec/DIV

Fig. 4-4-3

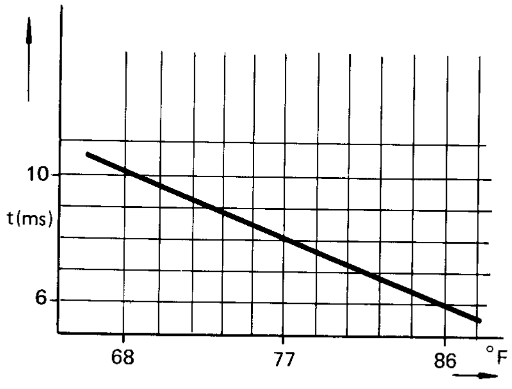


Fig. 4-4-4

(5) Gain adjustment

Test points : TP1
TP3
Adjust : VR001 (GAIN)

- Aim the camera at the white chart.
- Set distance between the object and camera to 2m.
- Set Auto ON/OFF switch to ON position.
- Connect the oscilloscope to TP1 and TP3.
- Adjust GAIN VR001 so that the receiving waveform at TP1 becomes 6.4 Vp-p. (Fig. 4-4-5)

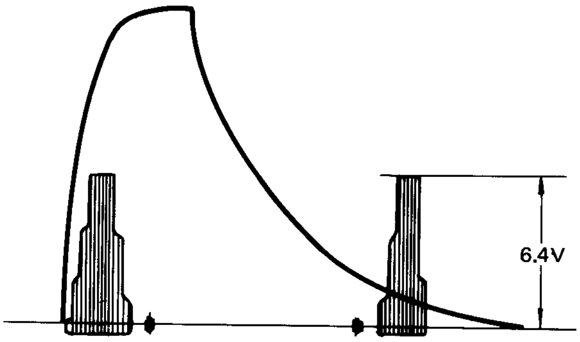


Fig. 4-4-5

Steps denoted by shading need not be performed for pick-up tube replacement only.

(6) Thermal correct adjustment

Test points : Pin 9 of IC001
Pin 10 of IC001
Adjust : VR004 (THERMAL CORRECT)

- Connect oscilloscope to pin 9 and pin 10 of IC001.
- Adjust THERMAL CORRECT VR004 so that the term between rise timing of pin 10 and decay timing of pin 9 become 1.3msec at 68°F. (Fig. 4-4-6)
- Select the timing (msec) which is shown at the vertical graduation through the temperature graduation and crosspoint in Fig. 4-4-7.

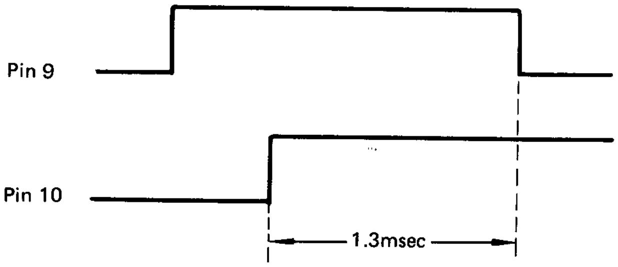


Fig. 4-4-6

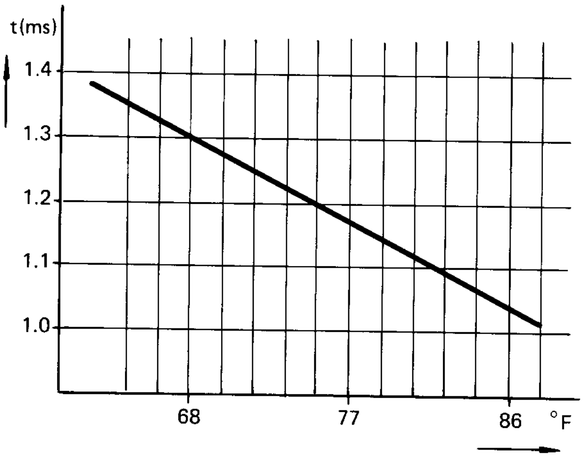
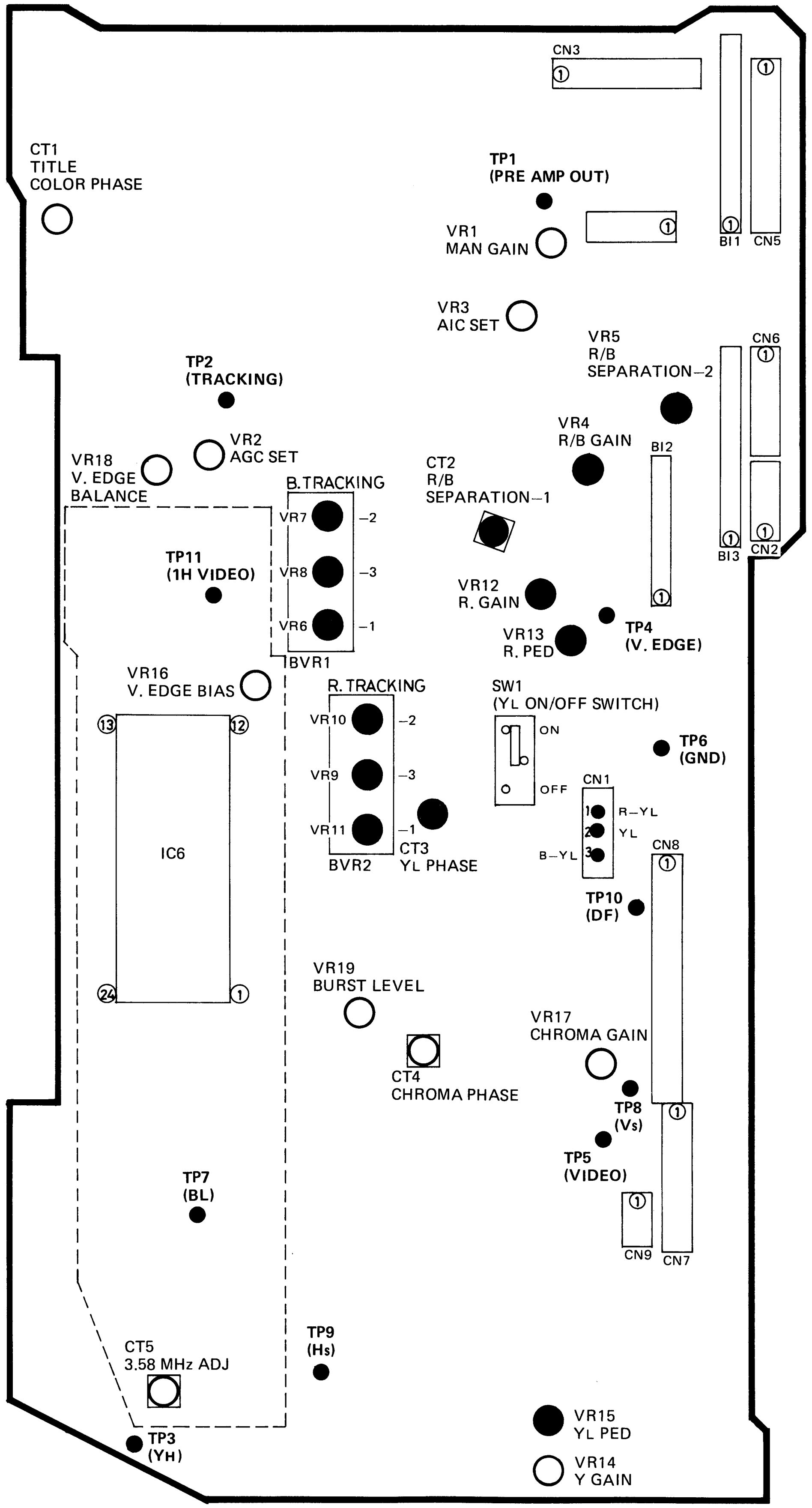
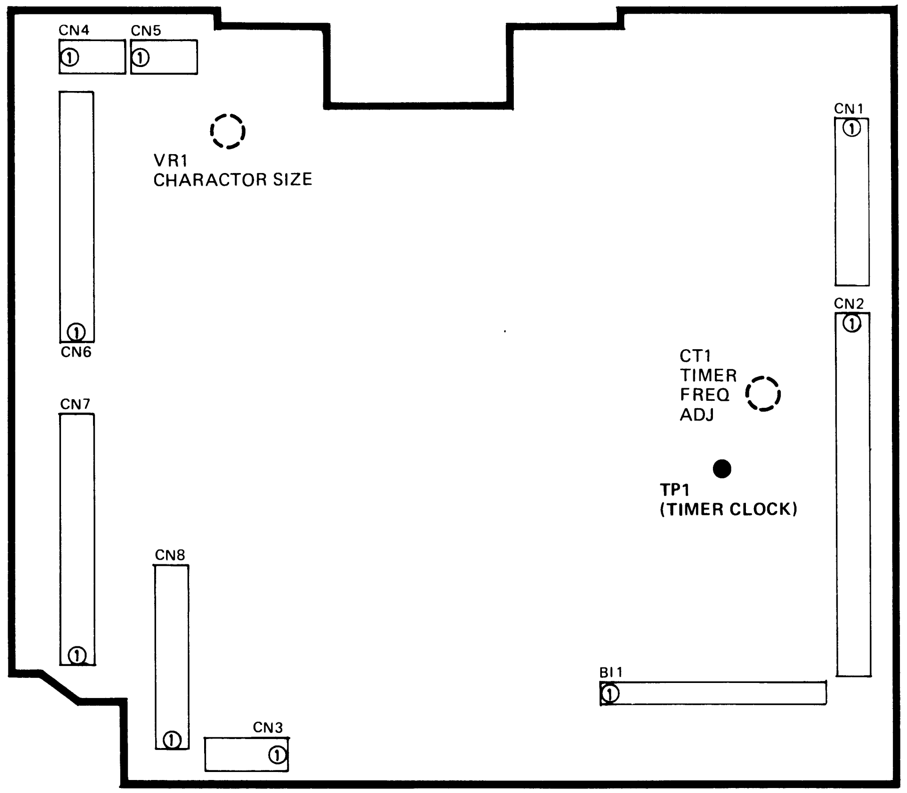


Fig. 4-4-7

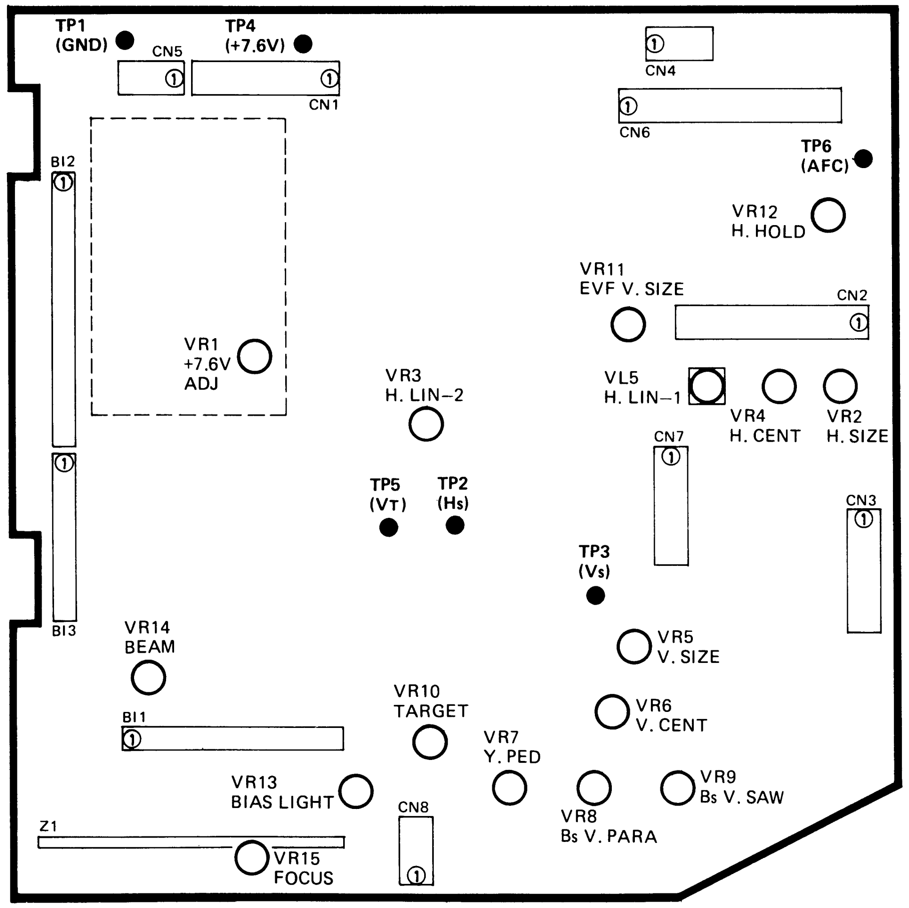
5. LOCATION OF TEST POINTS AND ADJUSTING CONTROLS


CN3
①
CT1
TITLE
COLOR PHASE
TP1
(PRE AMP OUT)
VR1
MAN GAIN
BI1
CN5
VR3
AIC SET
VR5
R/B
SEPARATION–2
CN6
TP2
(TRACKING)
VR4
R/B GAIN
BI2
VR18
V. EDGE
BALANCE
VR2
AGC SET
B.TRACKING
VR7
–2
VR8
–3
VR6
–1
BVR1
CT2
R/B
SEPARATION–1
TP11
(1H VIDEO)
VR12
R. GAIN
VR13
R. PED
TP4
(V. EDGE)
BI3
CN2
VR16
V. EDGE BIAS
R. TRACKING
VR10
–2
VR9
–3
VR11
–1
BVR2
CT3
YL PHASE
SW1
(YL ON/OFF SWITCH)
ON
OFF
TP6
(GND)
CN1
1
R–YL
2
YL
3
B–YL
CN8
⑬
⑫
IC6
㉔
①
TP10
(DF)
VR19
BURST LEVEL
VR17
CHROMA GAIN
CT4
CHROMA PHASE
TP8
(Vs)
TP5
(VIDEO)
CN9
CN7
TP7
(BL)
CT5
3.58 MHz ADJ
TP9
(Hs)
TP3
(YH)
VR15
YL PED
VR14
Y GAIN

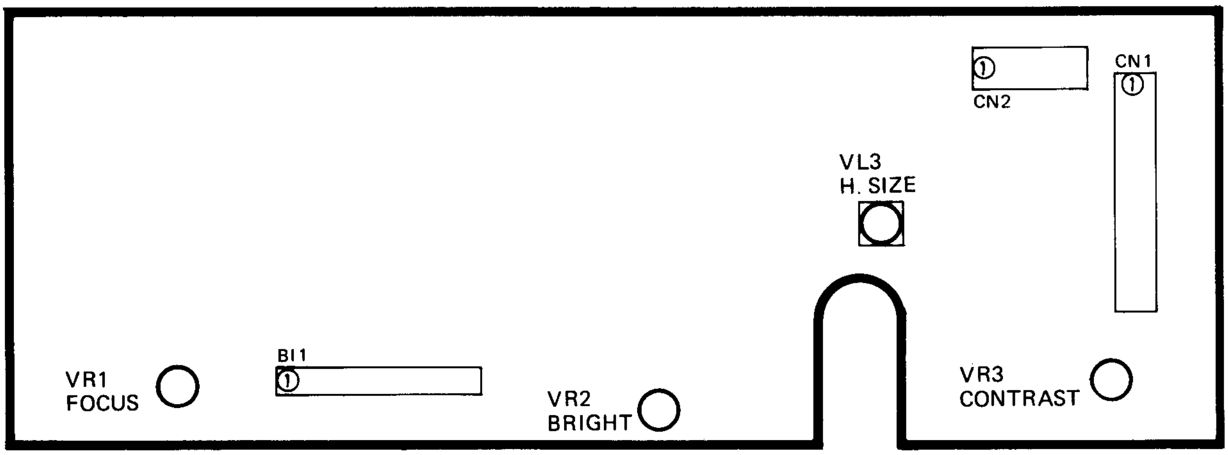
PROCESS BOARD
(YFVPKZ4860P3A)


CN4
①
CN5
①
VR1
CHARACTOR SIZE
CN1
CN6
CN2
CT1
TIMER
FREQ
ADJ
CN7
TP1
(TIMER CLOCK)
CN8
BI1
CN3

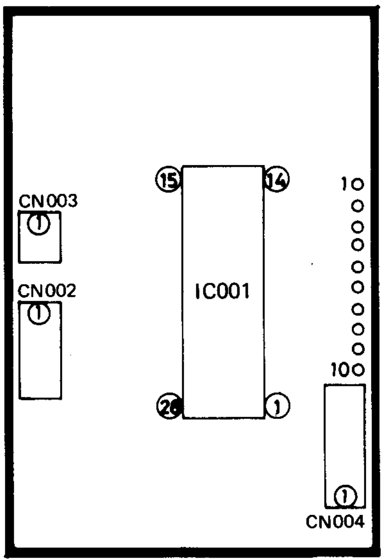
MICRO PROCESSOR BOARD
(YFVKY3230P4A)


TP1
(GND)
CN5
TP4
(+7.6V)
CN1
CN4
CN6
BI2
TP6
(AFC)
VR12
H. HOLD
VR11
EVF V. SIZE
CN2
VR1
+7.6V
ADJ
VR3
H. LIN–2
VL5
H. LIN–1
VR4
H. CENT
VR2
H. SIZE
CN7
TP5
(VT)
TP2
(Hs)
CN3
TP3
(Vs)
BI3
VR14
BEAM
VR5
V. SIZE
VR10
TARGET
VR6
V. CENT
BI1
VR7
Y. PED
VR13
BIAS LIGHT
VR9
Bs V. SAW
VR8
Bs V. PARA
CN8
Z1
VR15
FOCUS

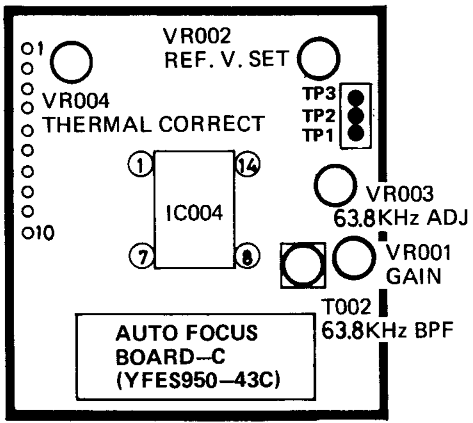
DEFLECTION BOARD
(YFVKY4860P1A)


CN2
①
CN1
①
VL3
H. SIZE
BI1
①
VR1
FOCUS
VR2
BRIGHT
VR3
CONTRAST

EVF BOARD
(YFVPKA0706JA)


CN003
①
CN002
①
⑮
⑭
IC001
㉘
①
1
10
CN004
①

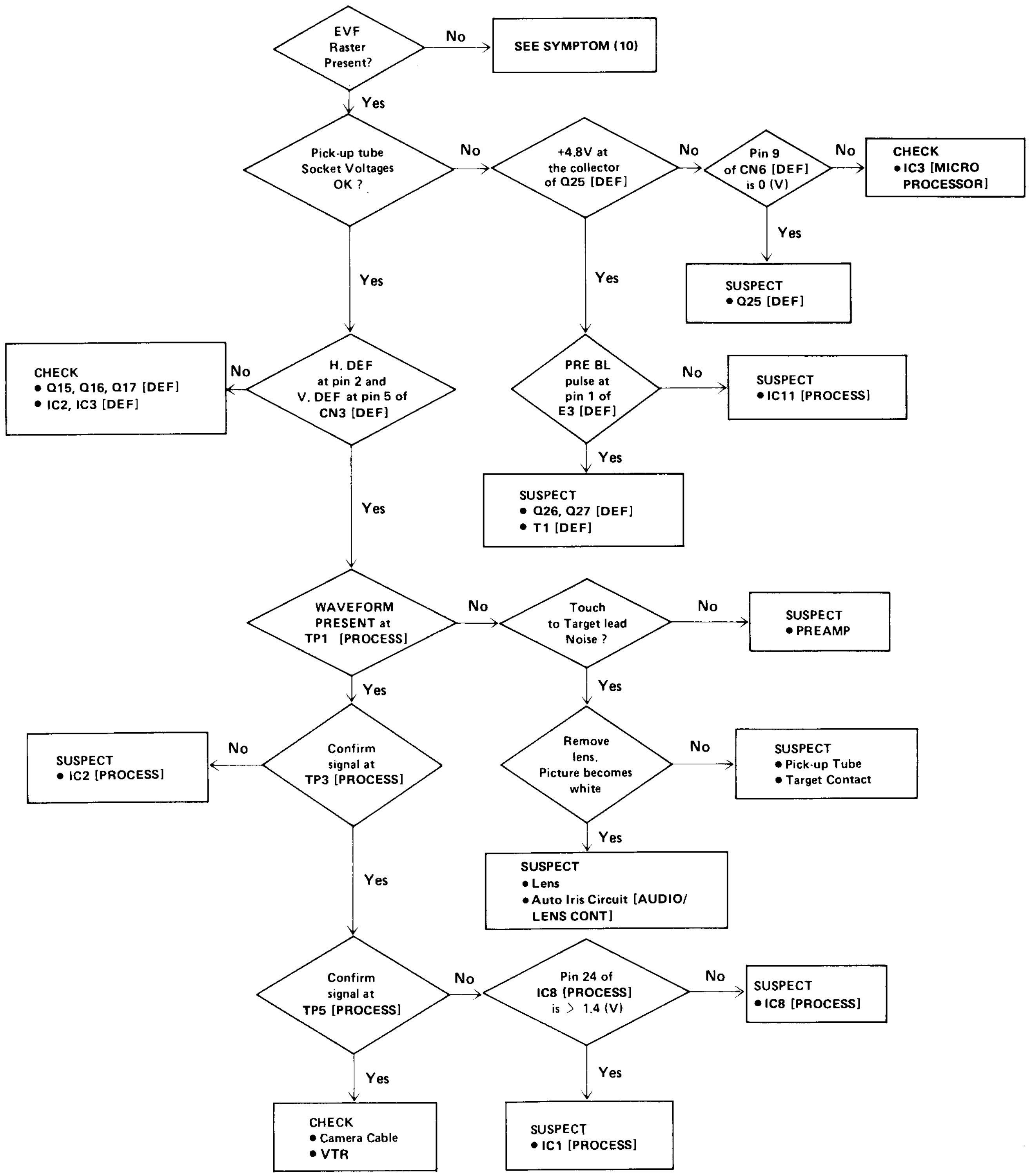
AUTO FOCUS BOARD–A
(YFES950–43A)


1
10
VR002
REF. V. SET
VR004
THERMAL CORRECT
TP3
TP2
TP1
①
⑭
IC004
⑦
⑧
VR003
63.8KHz ADJ
VR001
GAIN
T002
63.8KHz BPF
AUTO FOCUS
BOARD–C
(YFES950–43C)

AUTO FOCUS BOARD–B
(YFES950–43B)

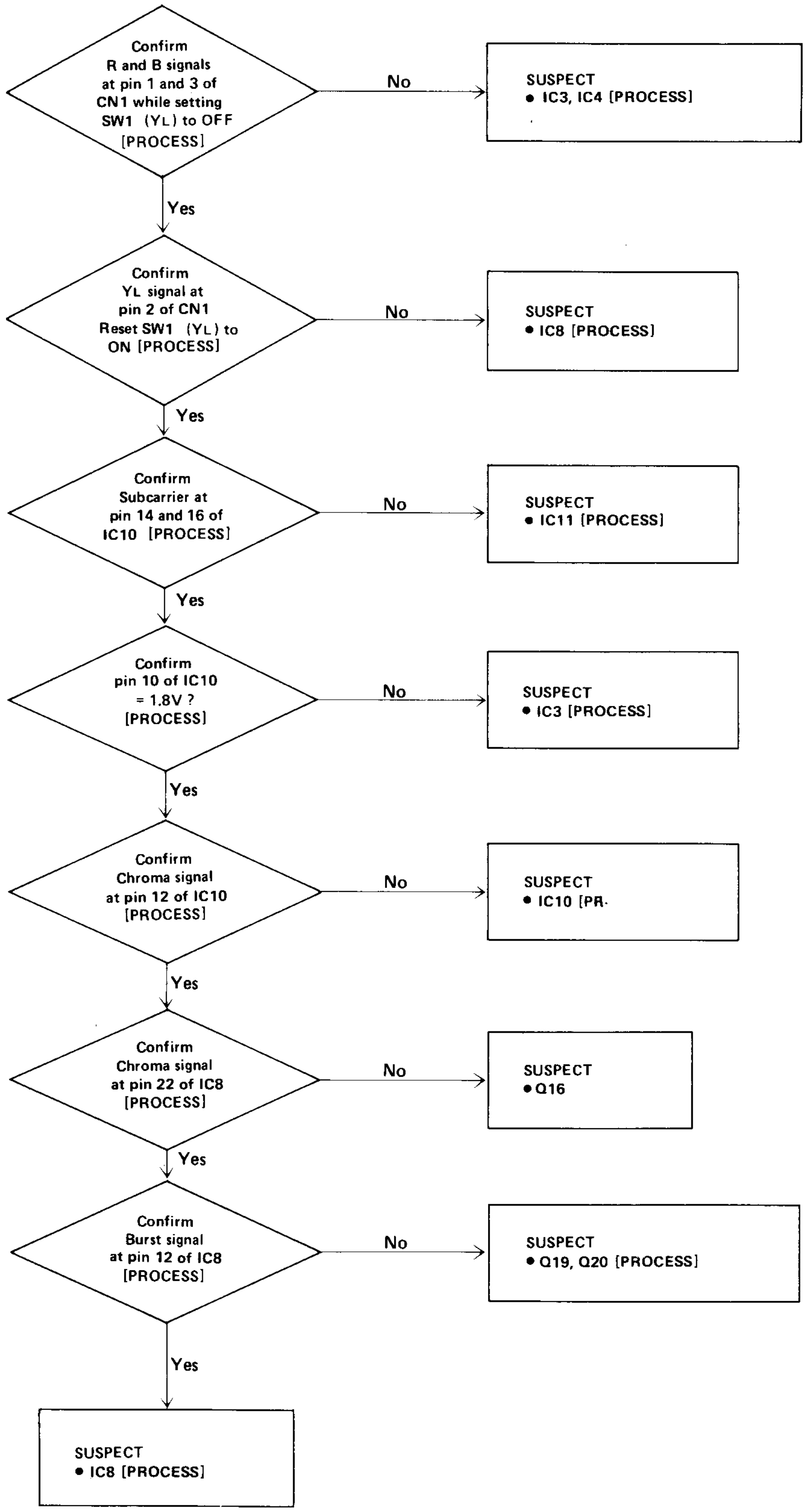
6. TROUBLE SHOOTING GUIDE

SYMPTOM (1) : No Video (Luminance) on Electronic Viewfinder or Monitor



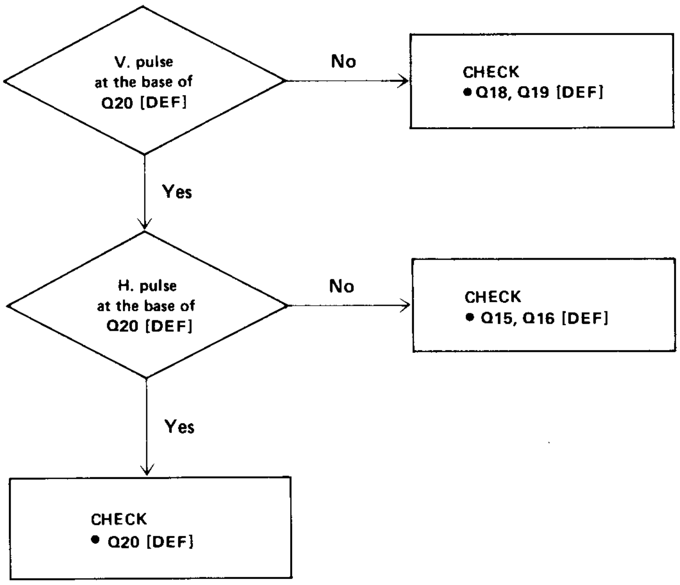
EVF Raster Present?
No
SEE SYMPTOM (10)
Yes
Pick-up tube Socket Voltages OK ?
No
+4.8V at the collector of Q25 [DEF]
No
Pin 9 of CN6 [DEF] is 0 (V)
No
CHECK
• IC3 [MICRO PROCESSOR]
Yes
SUSPECT
• Q25 [DEF]
Yes
Yes
CHECK
• Q15, Q16, Q17 [DEF]
• IC2, IC3 [DEF]
No
H. DEF at pin 2 and V. DEF at pin 5 of CN3 [DEF]
PRE BL pulse at pin 1 of E3 [DEF]
No
SUSPECT
• IC11 [PROCESS]
Yes
SUSPECT
• Q26, Q27 [DEF]
• T1 [DEF]
Yes
WAVEFORM PRESENT at TP1 [PROCESS]
No
Touch to Target lead Noise ?
No
SUSPECT
• PREAMP
Yes
Yes
SUSPECT
• IC2 [PROCESS]
No
Confirm signal at TP3 [PROCESS]
Remove lens. Picture becomes white
No
SUSPECT
• Pick-up Tube
• Target Contact
Yes
SUSPECT
• Lens
• Auto Iris Circuit [AUDIO/ LENS CONT]
Yes
Confirm signal at TP5 [PROCESS]
No
Pin 24 of IC8 [PROCESS] is > 1.4 (V)
No
SUSPECT
• IC8 [PROCESS]
Yes
Yes
CHECK
• Camera Cable
• VTR
SUSPECT
• IC1 [PROCESS]

SYMPTOM (2) : No Color on Monitor

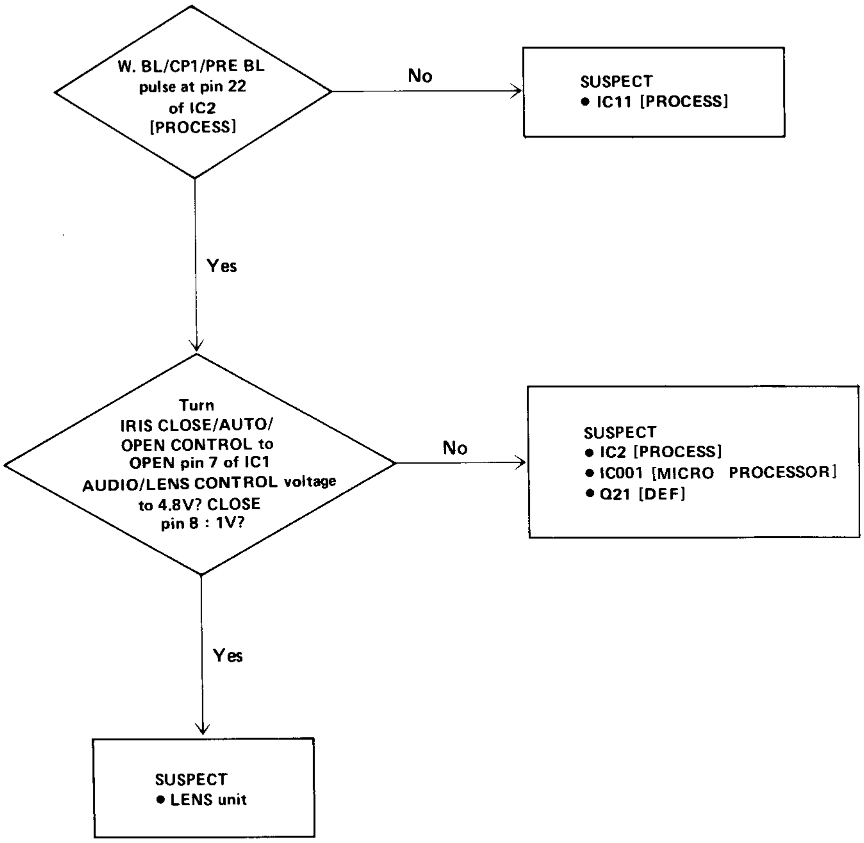


Confirm R and B signals at pin 1 and 3 of CN1 while setting SW1 (YL) to OFF [PROCESS]
No
SUSPECT
• IC3, IC4 [PROCESS]
Yes
Confirm YL signal at pin 2 of CN1 Reset SW1 (YL) to ON [PROCESS]
No
SUSPECT
• IC8 [PROCESS]
Yes
Confirm Subcarrier at pin 14 and 16 of IC10 [PROCESS]
No
SUSPECT
• IC11 [PROCESS]
Yes
Confirm pin 10 of IC10 = 1.8V ? [PROCESS]
No
SUSPECT
• IC3 [PROCESS]
Yes
Confirm Chroma signal at pin 12 of IC10 [PROCESS]
No
SUSPECT
• IC10 [PR-
Yes
Confirm Chroma signal at pin 22 of IC8 [PROCESS]
No
SUSPECT
• Q16
Yes
Confirm Burst signal at pin 12 of IC8 [PROCESS]
No
SUSPECT
• Q19, Q20 [PROCESS]
Yes
SUSPECT
• IC8 [PROCESS]

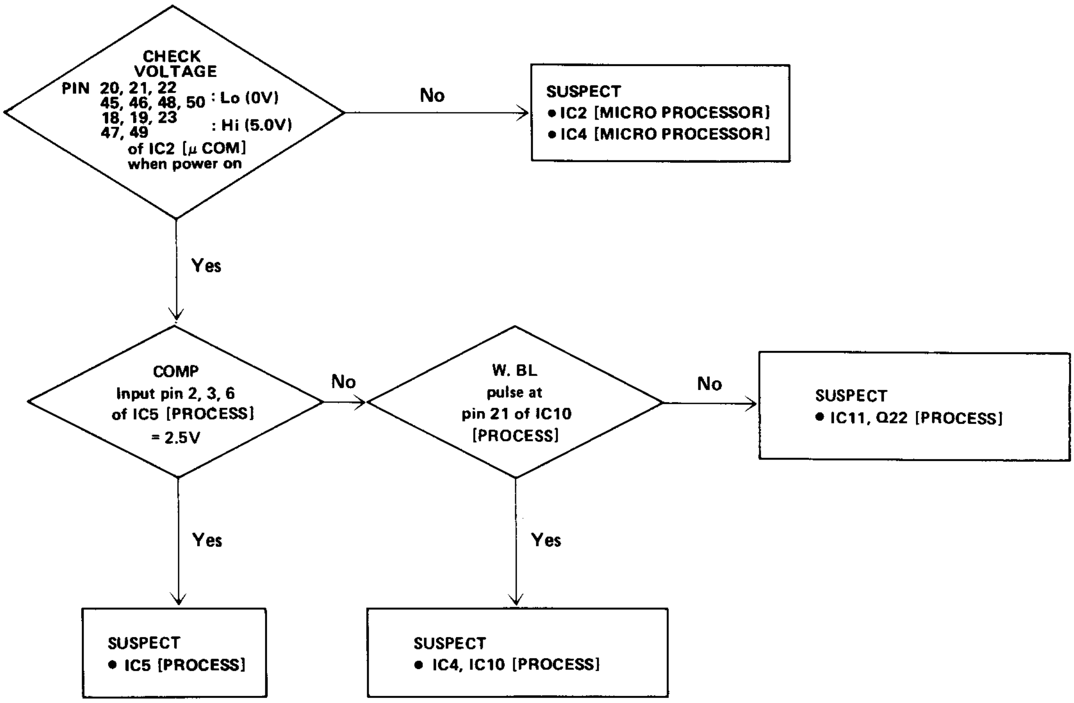
SYMPTOM (3) : Retrace Line in Electronic Viewfinder and Monitor


V. pulse at the base of Q20 [DEF]
No
CHECK
• Q18, Q19 [DEF]
Yes
H. pulse at the base of Q20 [DEF]
No
CHECK
• Q15, Q16 [DEF]
Yes
CHECK
• Q20 [DEF]

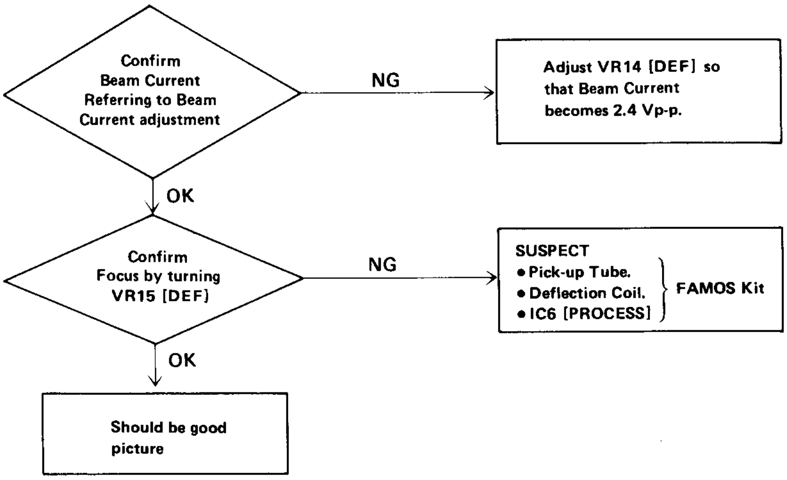
SYMPTOM (4) : Video Level Too High/Low
White Picture Areas Blooming
No/Incorrect Iris Operation


W. BL/CP1/PRE BL pulse at pin 22 of IC2 [PROCESS]
No
SUSPECT
• IC11 [PROCESS]
Yes
Turn IRIS CLOSE/AUTO/OPEN CONTROL to OPEN pin 7 of IC1 AUDIO/LENS CONTROL voltage to 4.8V? CLOSE pin 8 : 1V?
No
SUSPECT
• IC2 [PROCESS]
• IC001 [MICRO PROCESSOR]
• Q21 [DEF]
Yes
SUSPECT
• LENS unit

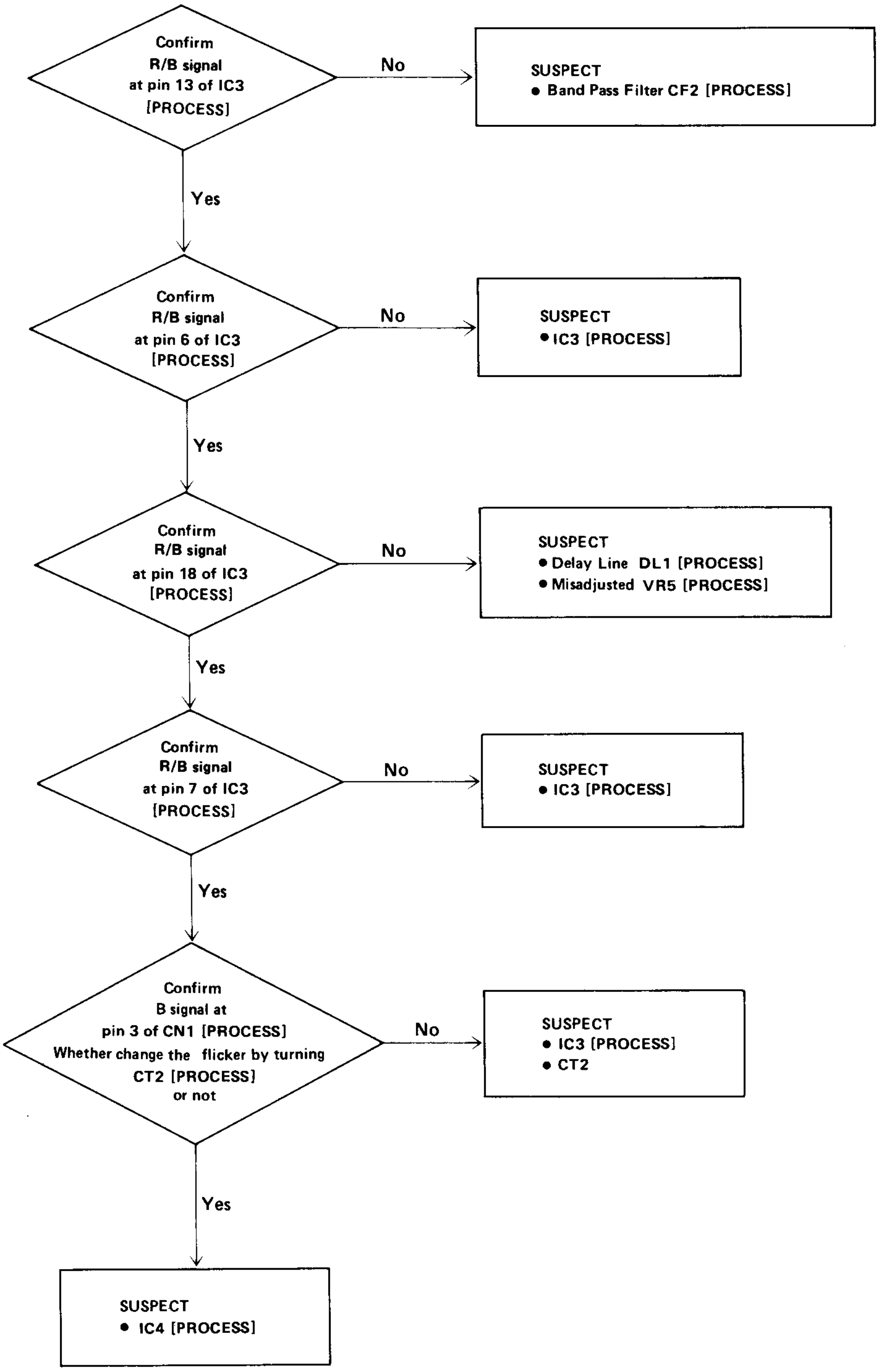
SYMPTOM (5) : Incorrect White Set Operation
Red, Blue, or Green Tinted Picture


CHECK VOLTAGE
PIN 20, 21, 22
45, 46, 48, 50 : Lo (0V)
18, 19, 23
47, 49 : Hi (5.0V)
of IC2 [μ COM]
when power on
No
SUSPECT
• IC2 [MICRO PROCESSOR]
• IC4 [MICRO PROCESSOR]
Yes
COMP
Input pin 2, 3, 6
of IC5 [PROCESS]
= 2.5V
No
W. BL
pulse at
pin 21 of IC10
[PROCESS]
No
SUSPECT
• IC11, Q22 [PROCESS]
Yes
Yes
SUSPECT
• IC5 [PROCESS]
SUSPECT
• IC4, IC10 [PROCESS]

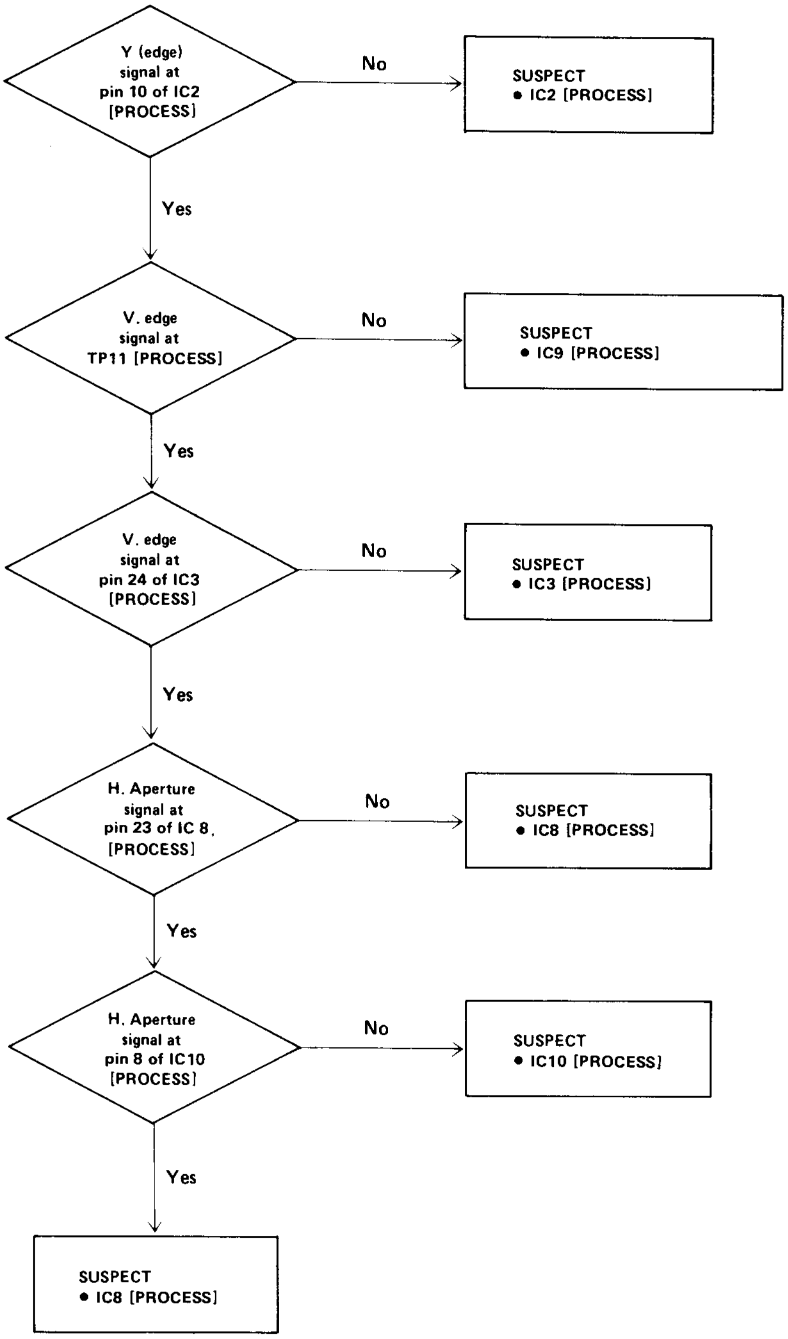
SYMPTOM (6) : Color Shading


Confirm
Beam Current
Referring to Beam
Current adjustment
NG
Adjust VR14 [DEF] so
that Beam Current
becomes 2.4 Vp-p.
OK
Confirm
Focus by turning
VR15 [DEF]
NG
SUSPECT
• Pick-up Tube.
• Deflection Coil.
• IC6 [PROCESS]
FAMOS Kit
OK
Should be good
picture

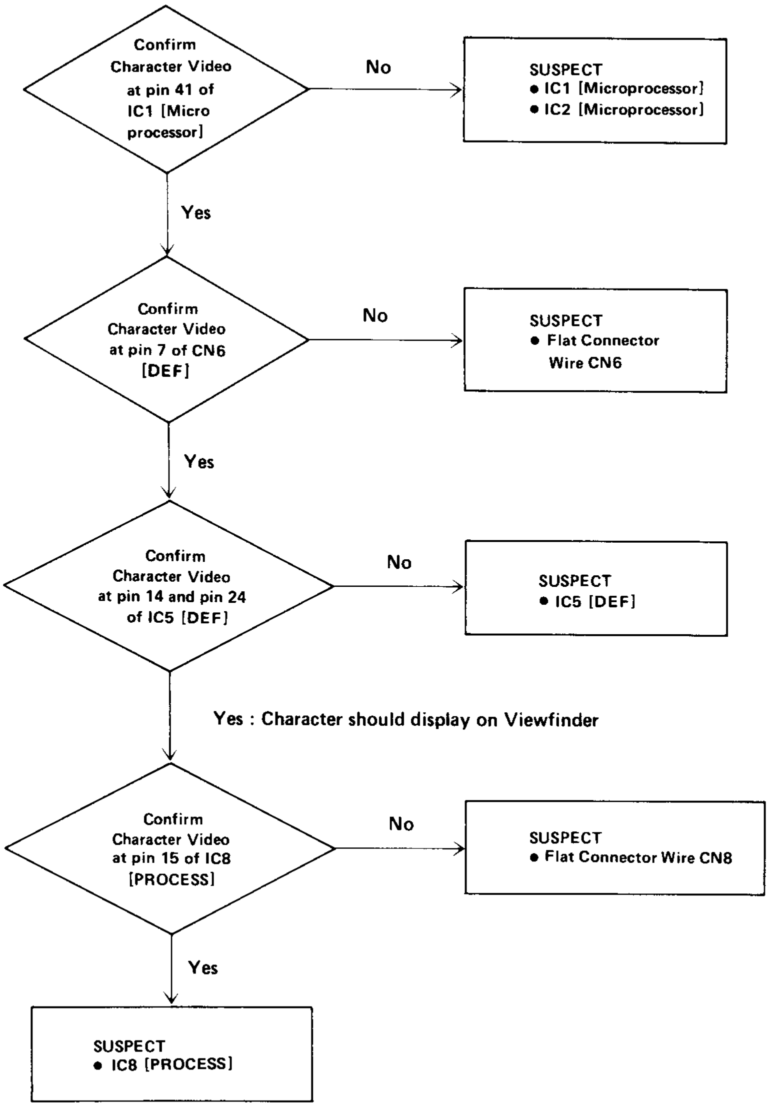
SYMPTOM (7): Incorrect Color
No Red or Blue Separation


Confirm R/B signal at pin 13 of IC3 [PROCESS]
No
SUSPECT
• Band Pass Filter CF2 [PROCESS]
Yes
Confirm R/B signal at pin 6 of IC3 [PROCESS]
No
SUSPECT
• IC3 [PROCESS]
Yes
Confirm R/B signal at pin 18 of IC3 [PROCESS]
No
SUSPECT
• Delay Line DL1 [PROCESS]
• Misadjusted VR5 [PROCESS]
Yes
Confirm R/B signal at pin 7 of IC3 [PROCESS]
No
SUSPECT
• IC3 [PROCESS]
Yes
Confirm B signal at pin 3 of CN1 [PROCESS] Whether change the flicker by turning CT2 [PROCESS] or not
No
SUSPECT
• IC3 [PROCESS]
• CT2
Yes
SUSPECT
• IC4 [PROCESS]

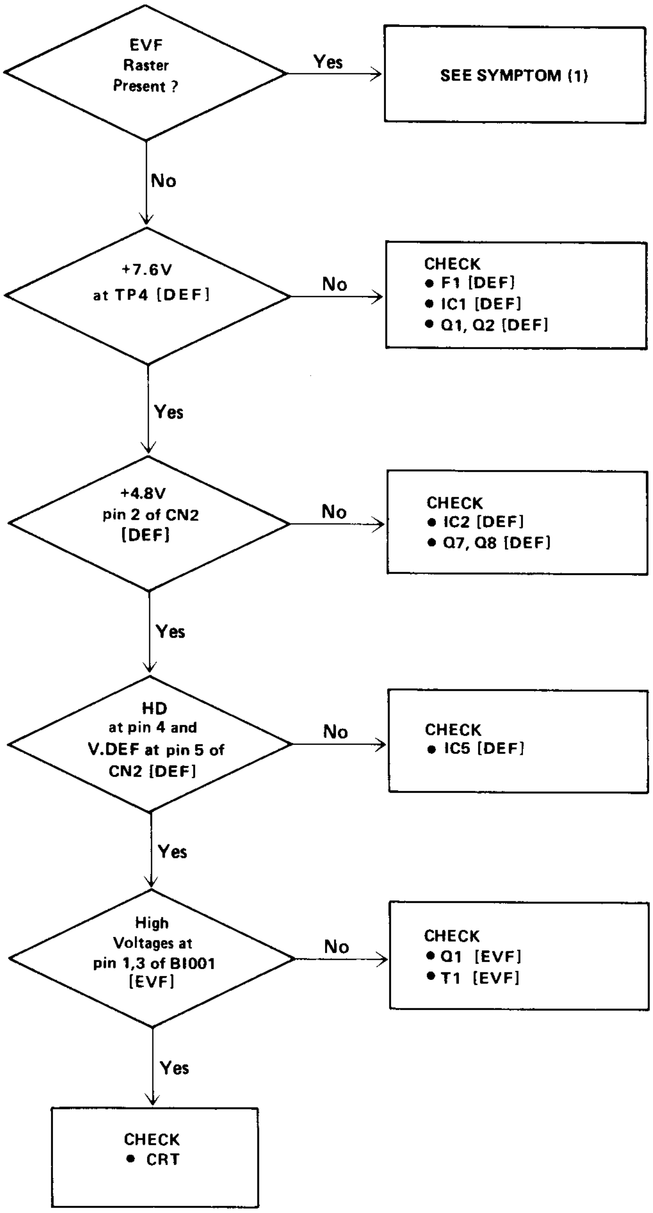
SYMPTOM (8): Soft Picture
No Vertical or Horizontal Detail


Y (edge) signal at pin 10 of IC2 [PROCESS]
No
SUSPECT
● IC2 [PROCESS]
Yes
V. edge signal at TP11 [PROCESS]
No
SUSPECT
● IC9 [PROCESS]
Yes
V. edge signal at pin 24 of IC3 [PROCESS]
No
SUSPECT
● IC3 [PROCESS]
Yes
H. Aperture signal at pin 23 of IC 8. [PROCESS]
No
SUSPECT
● IC8 [PROCESS]
Yes
H. Aperture signal at pin 8 of IC10 [PROCESS]
No
SUSPECT
● IC10 [PROCESS]
Yes
SUSPECT
● IC8 [PROCESS]

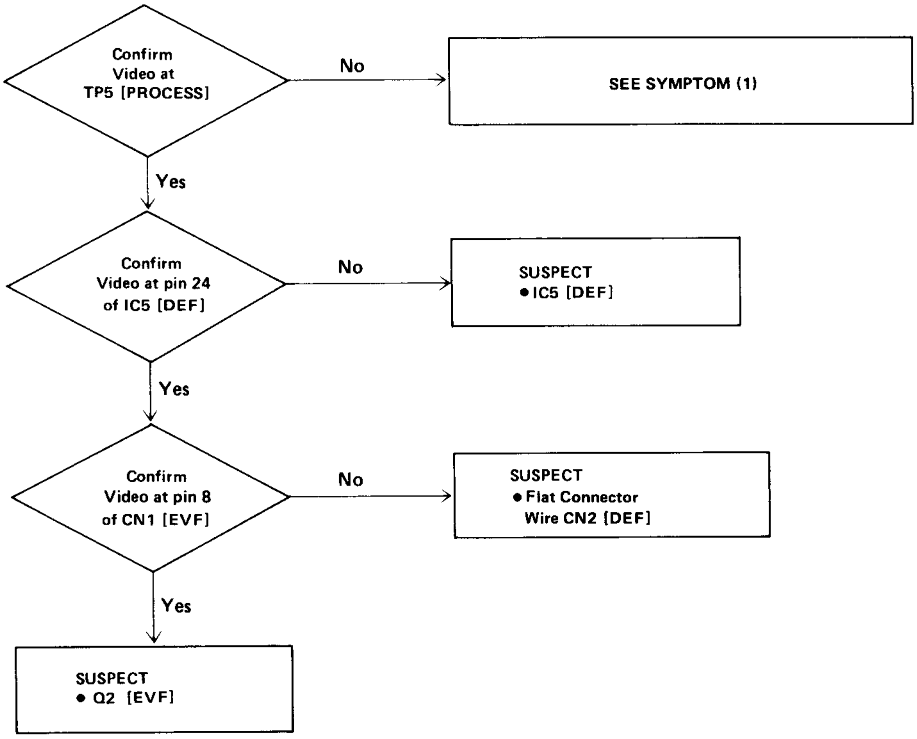
SYMPTOM (9) : No Character Display on Viewfinder or Monitor


Confirm Character Video at pin 41 of IC1 [Micro processor]
No
SUSPECT
● IC1 [Microprocessor]
● IC2 [Microprocessor]
Yes
Confirm Character Video at pin 7 of CN6 [DEF]
No
SUSPECT
● Flat Connector Wire CN6
Yes
Confirm Character Video at pin 14 and pin 24 of IC5 [DEF]
No
SUSPECT
● IC5 [DEF]
Yes : Character should display on Viewfinder
Confirm Character Video at pin 15 of IC8 [PROCESS]
No
SUSPECT
● Flat Connector Wire CN8
Yes
SUSPECT
● IC8 [PROCESS]

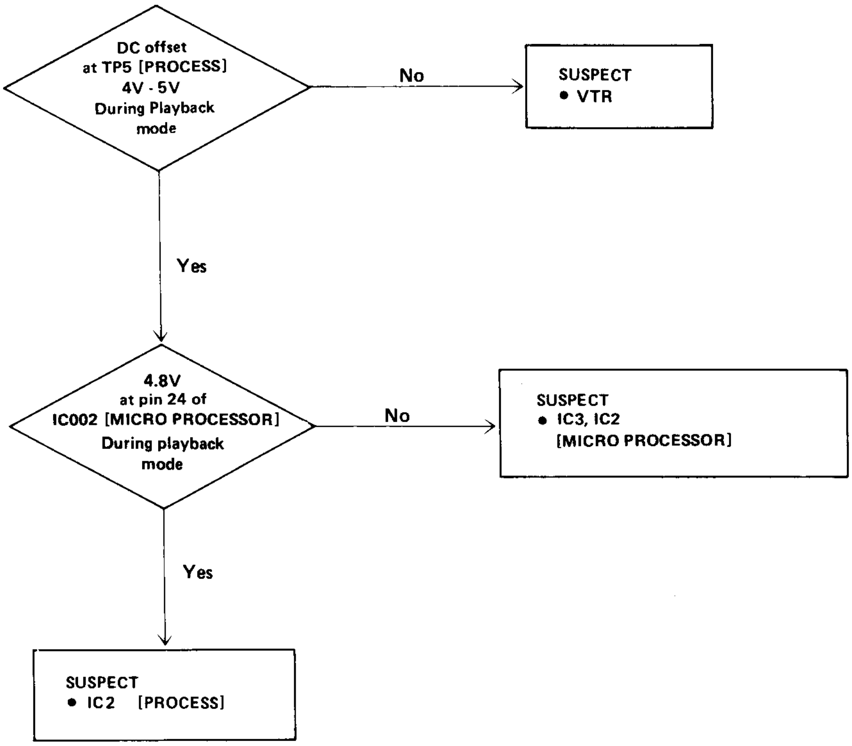
SYMPTOM (10) : No Electronic Viewfinder Raster


EVF Raster Present ?
Yes
SEE SYMPTOM (1)
No
+7.6V at TP4 [DEF]
No
CHECK
• F1 [DEF]
• IC1 [DEF]
• Q1, Q2 [DEF]
Yes
+4.8V pin 2 of CN2 [DEF]
No
CHECK
• IC2 [DEF]
• Q7, Q8 [DEF]
Yes
HD at pin 4 and V.DEF at pin 5 of CN2 [DEF]
No
CHECK
• IC5 [DEF]
Yes
High Voltages at pin 1,3 of BI001 [EVF]
No
CHECK
• Q1 [EVF]
• T1 [EVF]
Yes
CHECK
• CRT

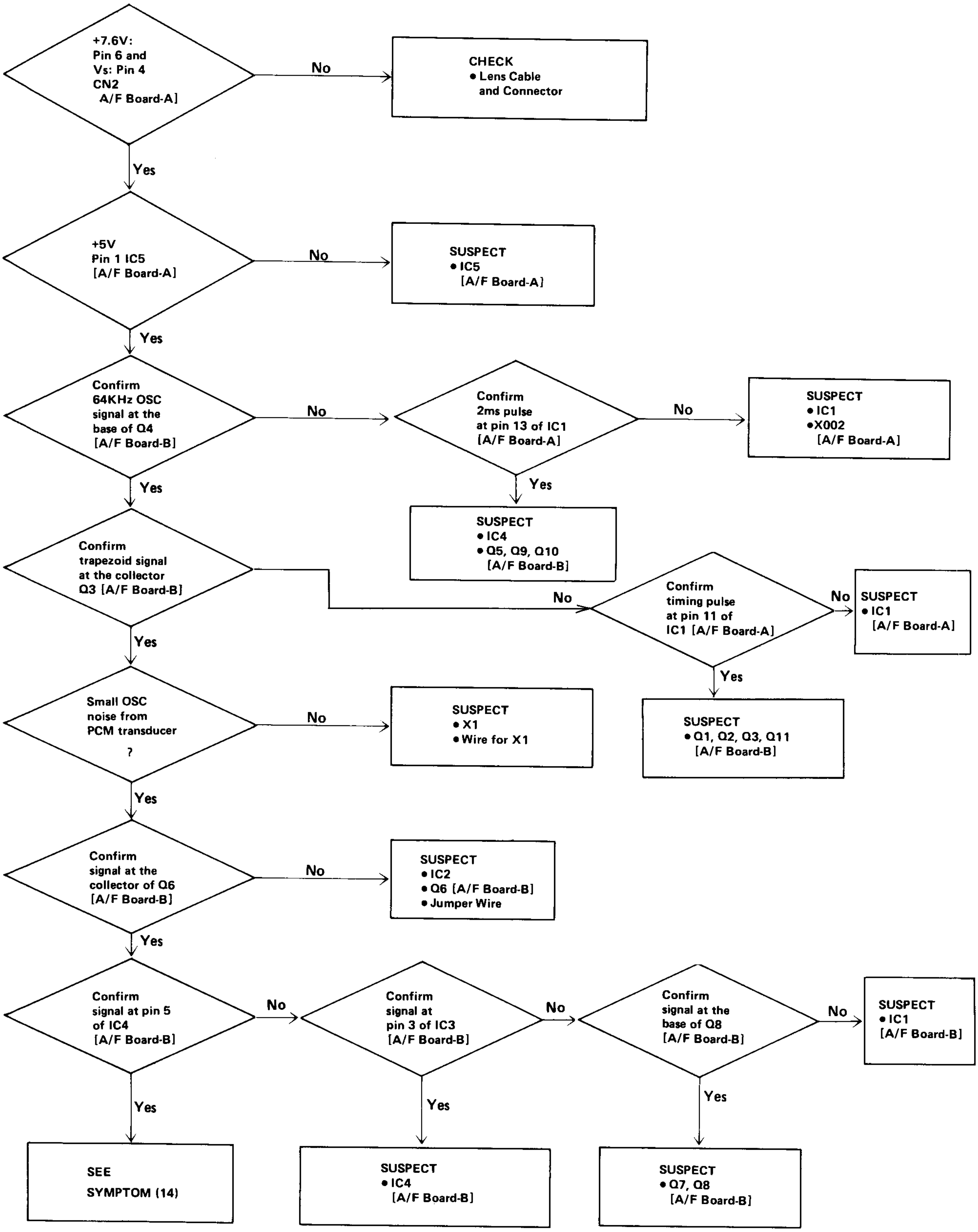
SYMPTOM (11) : No Video on Electronic Viewfinder Only


Confirm Video at TP5 [PROCESS]
No
SEE SYMPTOM (1)
Yes
Confirm Video at pin 24 of IC5 [DEF]
No
SUSPECT
● IC5 [DEF]
Yes
Confirm Video at pin 8 of CN1 [EVF]
No
SUSPECT
● Flat Connector Wire CN2 [DEF]
Yes
SUSPECT
● Q2 [EVF]

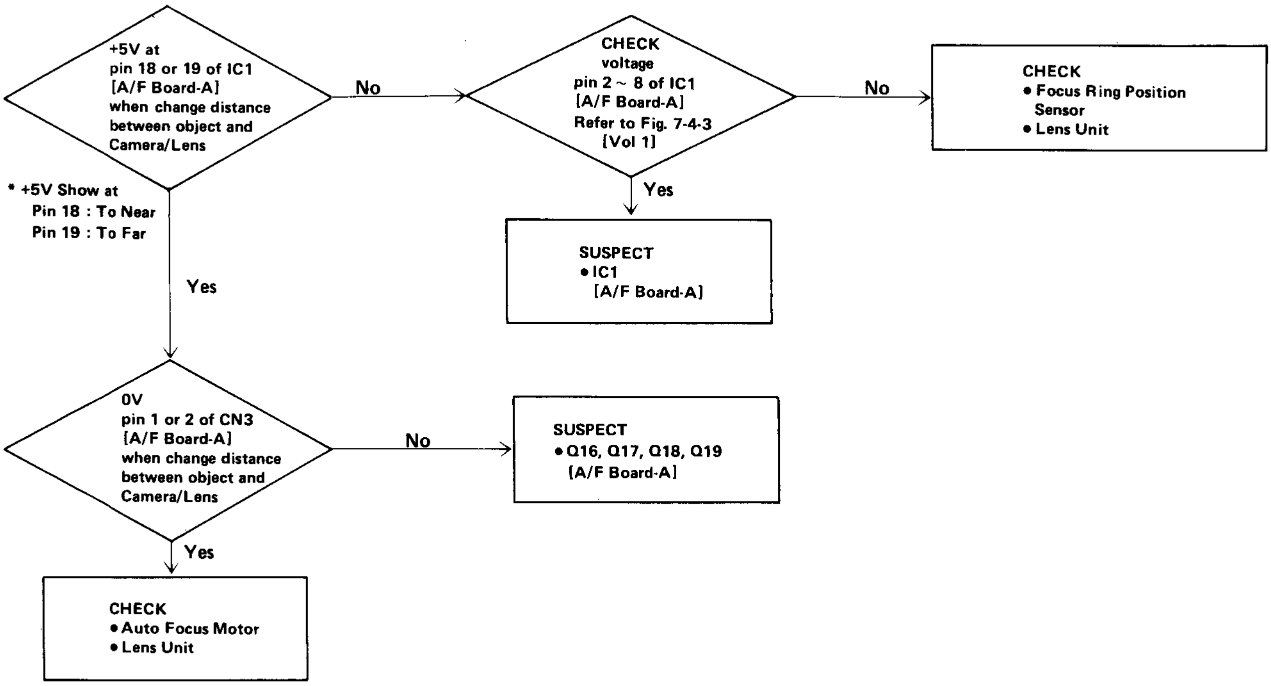
SYMPTOM (12) : Two Separate Images on Electronic Viewfinder Screen During Playback Mode


DC offset at TP5 [PROCESS] 4V - 5V During Playback mode
No
SUSPECT
● VTR
Yes
4.8V at pin 24 of IC002 [MICRO PROCESSOR] During playback mode
No
SUSPECT
● IC3, IC2 [MICRO PROCESSOR]
Yes
SUSPECT
● IC2 [PROCESS]

SYMPTOM (13) : Does Not Work Auto Focus —(1)


+7.6V:
Pin 6 and
Vs: Pin 4
CN2
A/F Board-A]
No
CHECK
• Lens Cable
and Connector
Yes
+5V
Pin 1 IC5
[A/F Board-A]
No
SUSPECT
• IC5
[A/F Board-A]
Yes
Confirm
64KHz OSC
signal at the
base of Q4
[A/F Board-B]
No
Confirm
2ms pulse
at pin 13 of IC1
[A/F Board-A]
No
SUSPECT
• IC1
•X002
[A/F Board-A]
Yes
SUSPECT
• IC4
• Q5, Q9, Q10
[A/F Board-B]
Yes
Confirm
trapezoid signal
at the collector
Q3 [A/F Board-B]
No
Confirm
timing pulse
at pin 11 of
IC1 [A/F Board-A]
No
SUSPECT
• IC1
[A/F Board-A]
Yes
SUSPECT
• Q1, Q2, Q3, Q11
[A/F Board-B]
Yes
Small OSC
noise from
PCM transducer
?
No
SUSPECT
• X1
• Wire for X1
Yes
Confirm
signal at the
collector of Q6
[A/F Board-B]
No
SUSPECT
• IC2
• Q6 [A/F Board-B]
• Jumper Wire
Yes
Confirm
signal at pin 5
of IC4
[A/F Board-B]
No
Confirm
signal at
pin 3 of IC3
[A/F Board-B]
No
Confirm
signal at the
base of Q8
[A/F Board-B]
No
SUSPECT
• IC1
[A/F Board-B]
Yes
SEE
SYMPTOM (14)
Yes
SUSPECT
• IC4
[A/F Board-B]
Yes
SUSPECT
• Q7, Q8
[A/F Board-B]

SYMPTOM (14) : Does Not Work Auto Focus —(2)


+5V at pin 18 or 19 of IC1 [A/F Board-A] when change distance between object and Camera/Lens
No
CHECK voltage pin 2 ~ 8 of IC1 [A/F Board-A] Refer to Fig. 7-4-3 [Vol 1]
No
CHECK
• Focus Ring Position Sensor
• Lens Unit
* +5V Show at
Pin 18 : To Near
Pin 19 : To Far
Yes
SUSPECT
• IC1 [A/F Board-A]
Yes
0V pin 1 or 2 of CN3 [A/F Board-A] when change distance between object and Camera/Lens
No
SUSPECT
• Q16, Q17, Q18, Q19 [A/F Board-A]
Yes
CHECK
• Auto Focus Motor
• Lens Unit

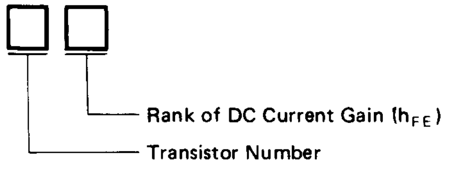
SYMPTOM (15) : Does Not Get Just Focus

- Check Backfocus on Camera
- Check Auto Focus Adjustment No

7. CHIP COMPONENTS

1. Chip Transistor

The transistor number is indicated on the top surface of the chip transistor using two alphabet letters.


Rank of DC Current Gain (hFE)
Transistor Number

Transistor Number

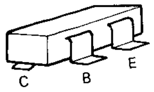
Letter	Transistor No.	Letter	Transistor No.
A	2SB709	X	2SD602A
B	2SB709A	Y	2SD601
C	2SB710	Z	2SD601A
D	2SB710A	1Z	2SD1030
E	2SA1022	1N	2SK199
F	2SA1034	1O	2SK198
H	2SA1035	1A	2SB799
I	2SB792	1B	2SB814
K	2SC2778	1C	2SB902
P	2SD814	1F	2SK321
Q	2SD813	1L	2SK247
R	2SC2480	1K	2SK316
S	2SC2405	1M	2SJ84
T	2SC2406	1T	2SC3077
U	2SC2404	1X	2SC2845
V	2SC2295	2B	2SK374
W	2SD602	2C	2SK116

Example

WQ ⟶ 2SD602 – Q
YQ ⟶ 2SD601 – Q
1BS ⟶ 2SB814 – S

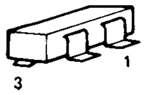
Outward Apperearance and Symbols

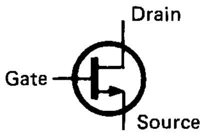
Transistor



C: Collector
B: Base
E: Emitter

FET

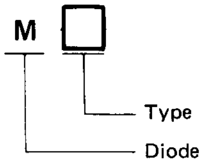



Drain
Gate
Source

	1	2	3
Standard Type	Drain	Source	Gate
2SK199	Gate	Drain	Source

2. Chip Diode

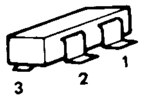
The diode number is indicated on the top surface of the chip diode using Two alphabet letters.

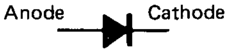

M
Type
Diode

Diode Number

Letter	Diode No.	Letter	Diode No.
MA	MA151A	MI	MA152K
MB	MA152A	MK	MA28W-B
MC	MA153	ML	MA28T-A
MD	MA28-A	MN	MA151WA
ME	MA28-B	MO	MA152WA
MF	MA28W-A	MT	MA151WK
MH	MA151K	MU	MA152WK

Outward Appearance and Symbols

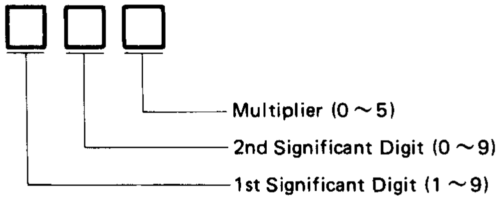



Anode
Cathode

	1	2	3
MA28/28W/28T	–	Anode	Cathode
MA151K/152K	–	Anode	Cathode
MA151A/152A	–	Cathode	Anode
MA151WK/MA152WK	Anode	Anode	Cathode
MA151WA/MA152WA	Cathode	Cathode	Anode
MA153	Cathode	Anode	Common

2. Chip Resistor

The resistor value is indicated on the bottom surface of the chip resistor using three digit numbers.


Multiplier (0 ~ 5)
2nd Significant Digit (0 ~ 9)
1st Significant Digit (1 ~ 9)

EXAMPLE:

330 ⟶ $33 \times 10^0 = 33$ ohms
561 ⟶ $56 \times 10^1 = 560$ ohms
123 ⟶ $12 \times 10^3 = 12$ kohms

Note: Zero ohm resistor (jumper chip) is colored red or green.

3. Chip Capacitor

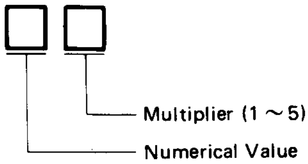
The capacitive value of replacement chip capacitors is indicated on the bottom surface. Original parts do not have value indication.

If the capacitive value is less than 100 pF, the value will be indicated by one or two digit number expressing the capacity directly in pF.

EXAMPLE:

0.5 ⟶ 0.5 pF   2.5 ⟶ 2.5 pF
.75 ⟶ 0.75 pF   33 ⟶ 33 pF
1 ⟶ 1 pF   82 ⟶ 82 pF

If the capacitive value is 100 pF or greater, the value will be indicated by an alpha-numeric code. The letter precedes the number and expresses a numerical value to be multiplied by the number which follows.



Numerical Value

Letter	Value	Letter	Value
A	10	N	33
B	11	P	36
C	12	Q	39
D	13	R	43
E	15	S	47
F	16	T	51
G	18	U	56
H	20	V	62
J	22	W	68
K	24	X	75
L	27	Y	82
M	30	Z	91

* Letters I and O are not used.

EXAMPLE:

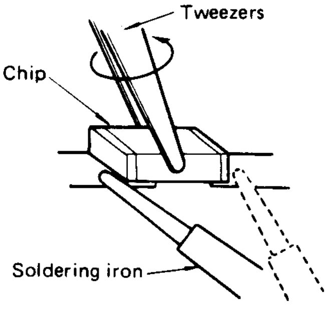
A1 ⟶ $10 \times 10^1 = 100$ pF
N2 ⟶ $33 \times 10^2 = 3300$ pF
S3 ⟶ $47 \times 10^3 = 47000$ pF

4. Precautions in replacing the chip component

1. Make sure that the unit is turned OFF when replacing the chip.
2. Use tweezers to prevent any damage to the chip surface.
3. Do not re-use the chips after removal.
4. Do not rub the electrode of chips.
5. Do not subject the chips to excessive stress.
6. It is recommended that a pencil-type soldering iron to be used.
7. The solder whose diameter is less than 0.5 mm is recommended.
8. Do not heat the chip beyond 3 seconds.
9. Maintain temperature control under 260°C (500°F) when soldering.

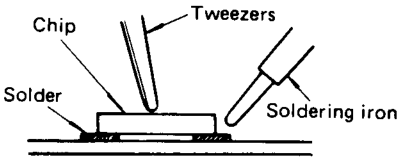
4-1 Removal

1. Add the solder to both ends of the chip (three leads for chip transistor).
2. While attaching the soldering iron to both ends of the chip (three leads for chip transistor) as shown below, remove the chip by turning it with tweezers.
   Note: Be careful not to damage other chips.

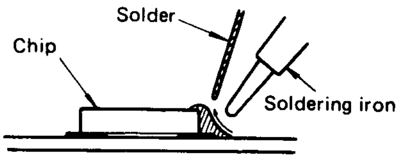


4-2 Mounting

1. Place the solder thinly on the chip mounting foil.
2. Solder the chip temporarily while holding the chip with the tweezers.



3. Solder both ends of chip (three leads for chip transistor).



ORDER NO. VKD83070765C4

Service Manual

Vol. 3

Block Diagrams
Schematic Diagrams
Conductor Views

Color Video Camera
WV-4860

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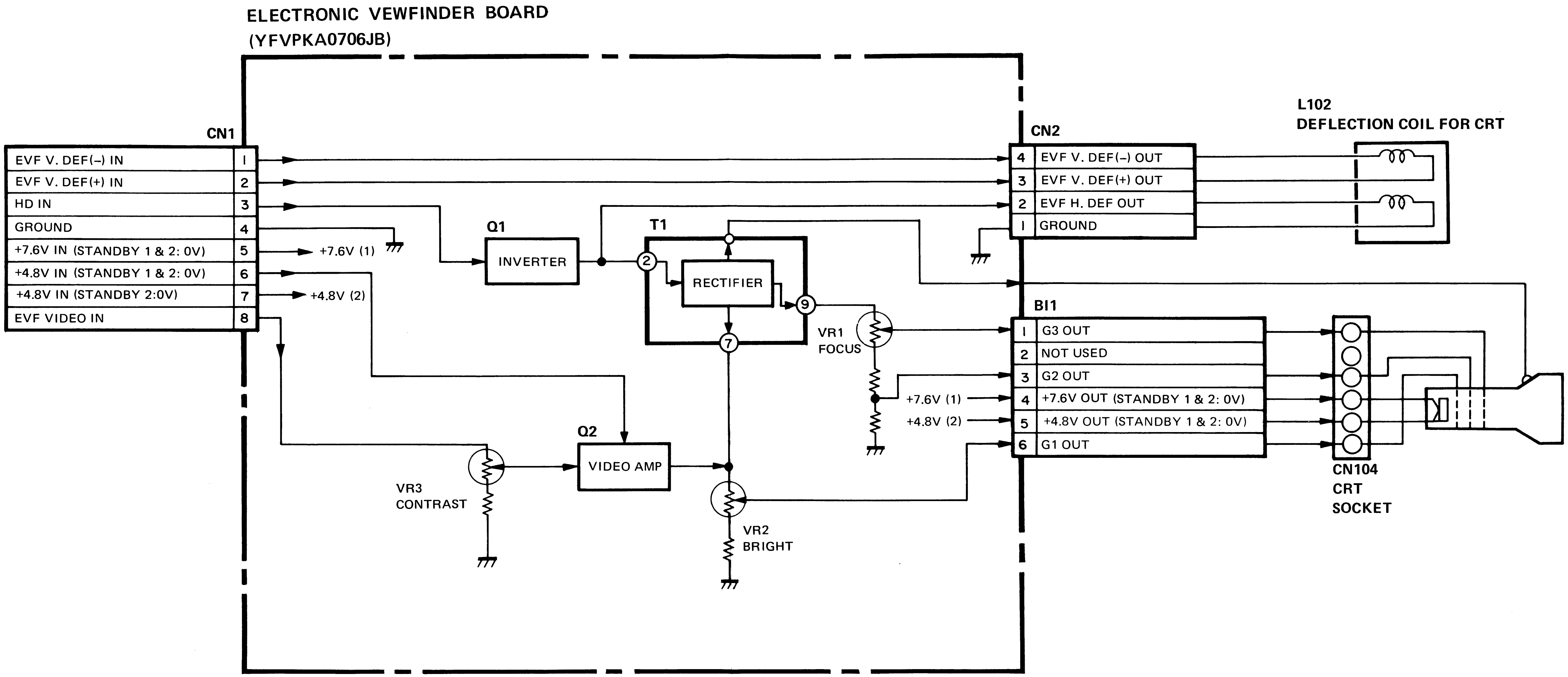
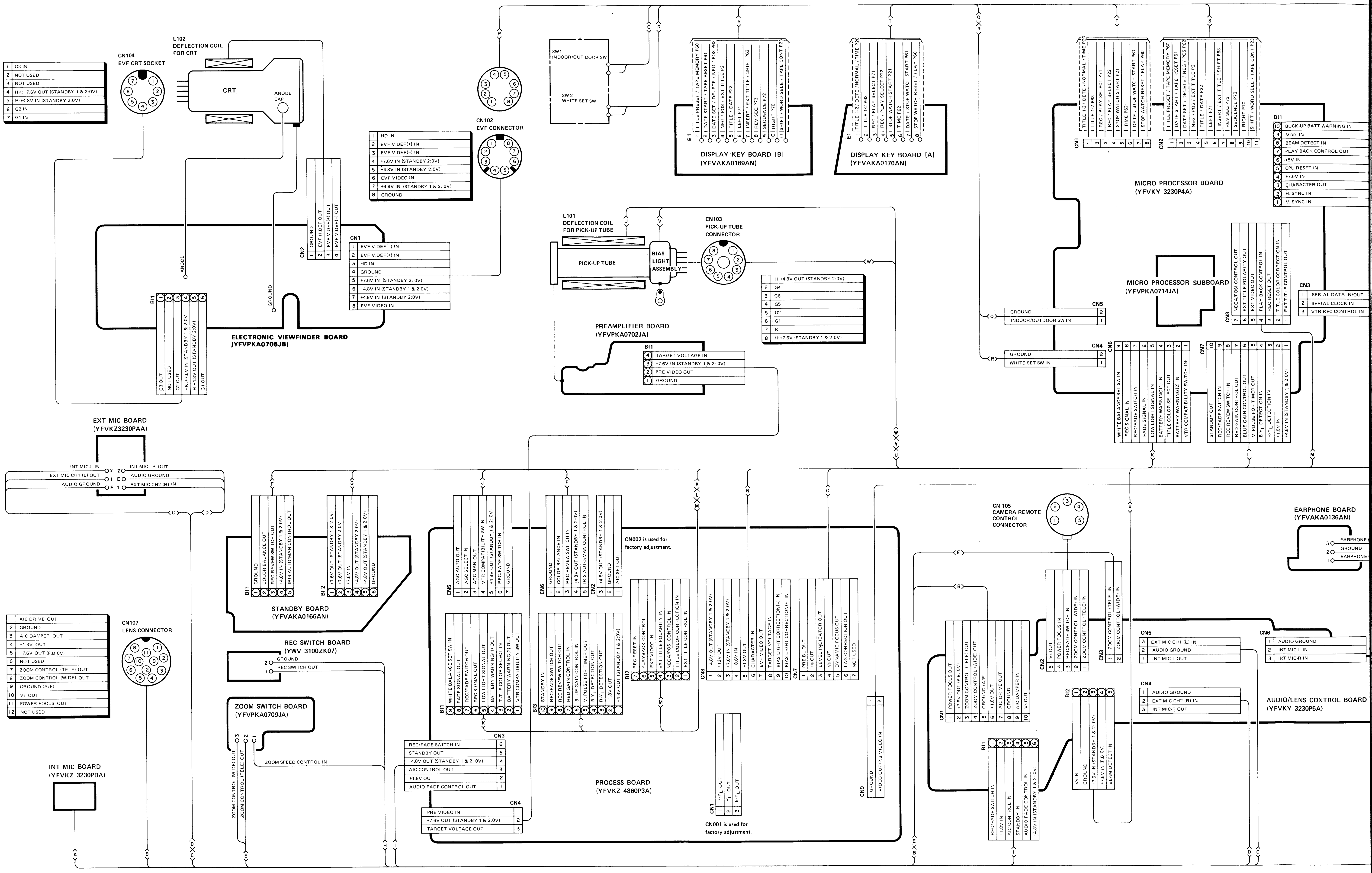
Panasonic

Panasonic Tokyo
Matsushita Electric Industrial Co., Ltd.
1-2, 1-chome, Shibakoen, Minato-ku, Tokyo 105 Japan

BLOCK DIAGRAM OF ELECTRONIC VIEWFINDER BOARD (YFVPKA0706JB)

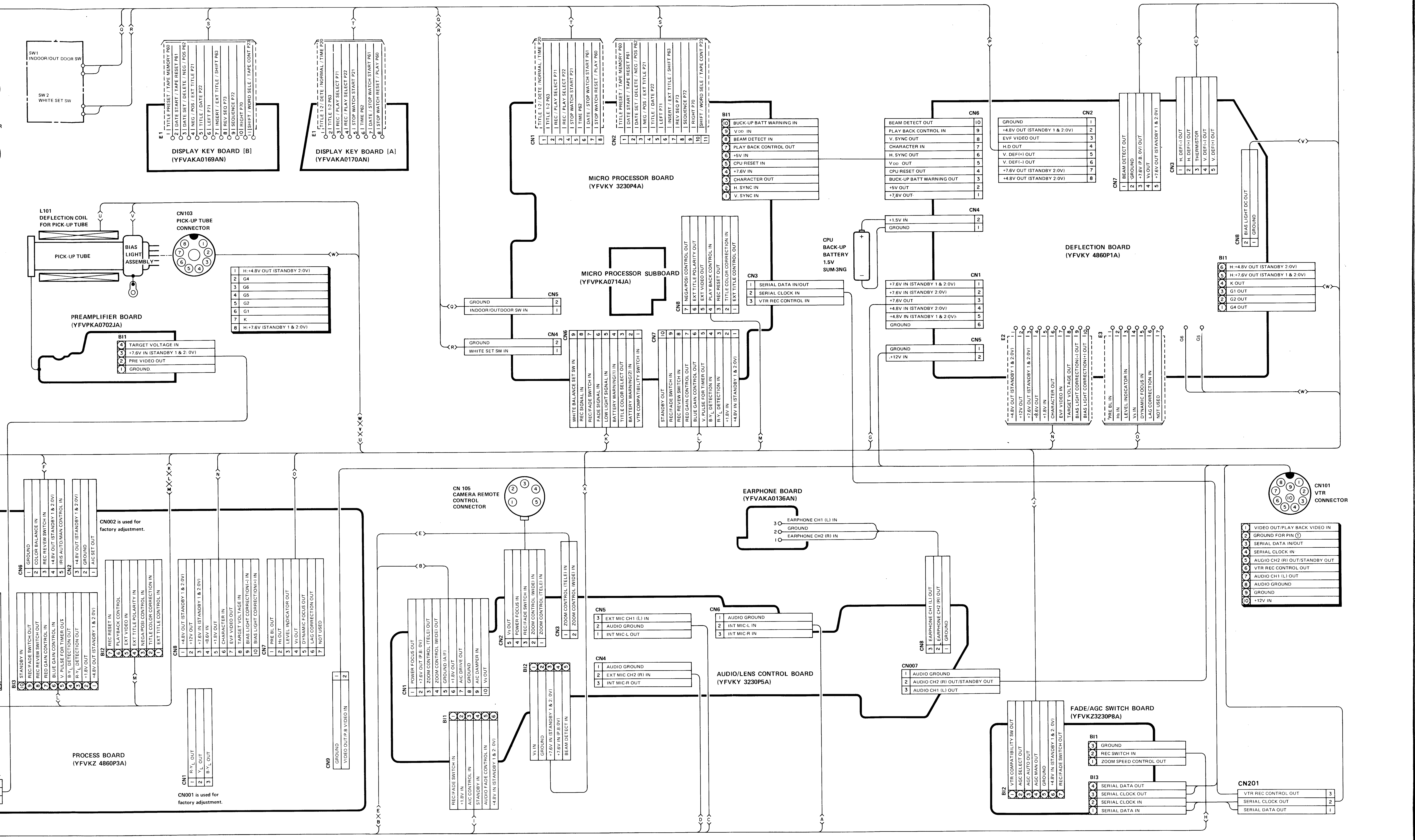

ELECTRONIC VEWFINDER BOARD
(YFVPKA0706JB)
CN1
EVF V. DEF(–) IN 1
EVF V. DEF(+) IN 2
HD IN 3
GROUND 4
+7.6V IN (STANDBY 1 & 2: 0V) 5
+4.8V IN (STANDBY 1 & 2: 0V) 6
+4.8V IN (STANDBY 2:0V) 7
EVF VIDEO IN 8
+7.6V (1)
+4.8V (2)
Q1
INVERTER
T1
RECTIFIER
2
9
7
Q2
VIDEO AMP
VR3
CONTRAST
VR2
BRIGHT
VR1
FOCUS
+7.6V (1)
+4.8V (2)
CN2
4 EVF V. DEF(–) OUT
3 EVF V. DEF(+) OUT
2 EVF H. DEF OUT
1 GROUND
L102
DEFLECTION COIL FOR CRT
BI1
1 G3 OUT
2 NOT USED
3 G2 OUT
4 +7.6V OUT (STANDBY 1 & 2: 0V)
5 +4.8V OUT (STANDBY 1 & 2: 0V)
6 G1 OUT
CN104
CRT
SOCKET

WIRING DIAGRAM



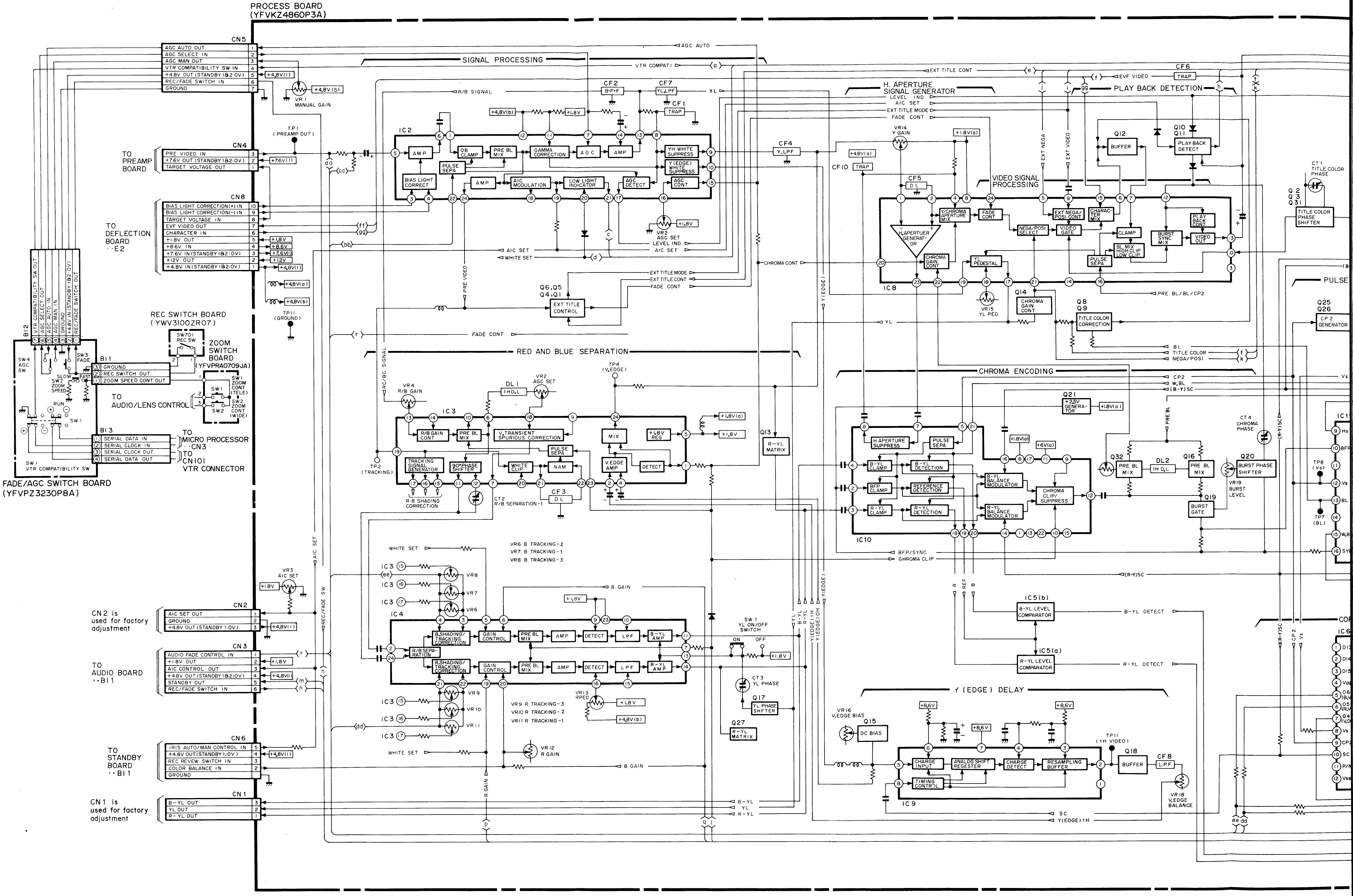
CN104
EVF CRT SOCKET
1 G3 IN
2 NOT USED
3 NOT USED
4 HK:+7.6V OUT (STANDBY 1 & 2:0V)
5 H:+4.8V IN (STANDBY 2:0V)
6 G2 IN
7 G1 IN
L102
DEFLECTION COIL
FOR CRT
CRT
ANODE CAP
ANODE
GROUND
CN102
EVF CONNECTOR
1 HD IN
2 EVF V.DEF(+) IN
3 EVF V.DEF(-) IN
4 +7.6V IN (STANDBY 2:0V)
5 +4.8V IN (STANDBY 2:0V)
6 EVF VIDEO IN
7 +4.8V IN (STANDBY 1 & 2: 0V)
8 GROUND
CN2
1 GROUND
2 EVF H.DEF OUT
3 EVF V.DEF(+) OUT
4 EVF V.DEF(-) OUT
CN1
1 EVF V.DEF(-) IN
2 EVF V.DEF(+) IN
3 HD IN
4 GROUND
5 +7.6V IN (STANDBY 2: 0V)
6 +4.8V IN (STANDBY 1 & 2:0V)
7 +4.8V IN (STANDBY 2:0V)
8 EVF VIDEO IN
BI1
G3 OUT
NOT USED
G2 OUT
HK:+7.6V IN (STANDBY 1 & 2:0V)
H:+4.8V OUT (STANDBY 2:0V)
G1 OUT
ELECTRONIC VIEWFINDER BOARD
(YFVPKA0706JB)
SW1
INDOOR/OUT DOOR SW
SW 2
WHITE SET SW
L101
DEFLECTION COIL
FOR PICK-UP TUBE
PICK-UP TUBE
BIAS LIGHT ASSEMBLY
CN103
PICK-UP TUBE CONNECTOR
1 H:+4.8V OUT (STANDBY 2:0V)
2 G4
3 G6
4 G5
5 G2
6 G1
7 K
8 H:+7.6V (STANDBY 1 & 2:0V)
PREAMPLIFIER BOARD
(YFVPKA0702JA)
BI1
4 TARGET VOLTAGE IN
3 +7.6V IN (STANDBY 1 & 2: 0V)
2 PRE VIDEO OUT
1 GROUND
E1
1 TITLE PRESET / TAPE MEMORY P60
2 DATE START / TAPE RESET P61
3 DATE SET / DELETE / NEG / POS P62
4 NEG / POS / EXT TITLE P21
5 TITLE / DATE P22
6 LEFT P71
7 INSERT / EXT TITLE / SHIFT P63
8 REV SEQ P73
9 SEQUENCE P72
10 RIGHT P70
11 SHIFT / WORD SELE / TAPE CONT P23
DISPLAY KEY BOARD [B]
(YFVAKA0169AN)
E1
1 TITLE 1-2 DETE /NORMAL / TIME P20
2 TITLE 1-2 P63
3 REC / PLAY SELECT P71
4 REC / PLAY SELECT P22
5 STOP WATCH START P21
6 TIME P62
7 DATE / STOP WATCH START P61
8 DATE / STOP WATCH RESET / PLAY P60
DISPLAY KEY BOARD [A]
(YFVAKA0170AN)
CN1
CN2
BI1
10 BUCK-UP BATT WARNING IN
9 VDD IN
8 BEAM DETECT IN
7 PLAY BACK CONTROL OUT
6 +5V IN
5 CPU RESET IN
4 +7.6V IN
3 CHARACTER OUT
2 H. SYNC IN
1 V. SYNC IN
MICRO PROCESSOR BOARD
(YFVKY 3230P4A)
MICRO PROCESSOR SUBBOARD
(YFVPKA0714JA)
CN8
7 NEGA/POSI CONTROL OUT
6 EXT TITLE POLARITY OUT
5 EXT VIDEO OUT
4 PLAY BACK CONTROL IN
3 REC RESET OUT
2 TITLE COLOR CORRECTION IN
1 EXT TITLE CONTROL OUT
CN3
1 SERIAL DATA IN/OUT
2 SERIAL CLOCK IN
3 VTR REC CONTROL IN
CN5
GROUND 2
INDOOR/OUTDOOR SW IN 1
CN4
GROUND 2
WHITE SET SW IN 1
CN6
WHITE BALANCE SET SW IN
REC SIGNAL IN
FADE SIGNAL IN
LOW LIGHT SIGNAL IN
BATTERY WARNING(1) IN
TITLE COLOR SELECT OUT
BATTERY WARNING(2) IN
VTR COMPATIBILITY SWITCH IN
CN7
STANDBY OUT
REC/FADE SWITCH IN
REC REVIEW SWITCH IN
RED GAIN CONTROL OUT
BLUE GAIN CONTROL OUT
V. PULSE FOR TIMER OUT
B-YL DETECTION IN
R-YL DETECTION IN
+1.8V IN
+4.8V IN (STANDBY 1 & 2:0V)
EXT MIC BOARD
(YFVKZ3230PAA)
INT MIC-L IN
EXT MIC CH1 (L) OUT
AUDIO GROUND
INT MIC - R OUT
AUDIO GROUND
EXT MIC CH2 (R) IN
BI1
GROUND
COLOR BALANCE OUT
REC REVEW SWITCH OUT
+4.8V IN (STANDBY 1 & 2:0V)
IRIS AUTO/MAN CONTROL OUT
BI2
+7.6V OUT (STANDBY 1 & 2:0V)
+7.6V OUT (STANDBY 2:0V)
+7.6V IN
+4.8V OUT (STANDBY 2:0V)
+4.8V OUT (STANDBY 1 & 2:0V)
GROUND
STANDBY BOARD
(YFVAKA0166AN)
REC SWITCH BOARD
(YWV 3100ZK07)
GROUND
REC SWITCH OUT
ZOOM SWITCH BOARD
(YFVPKA0709JA)
ZOOM CONTROL (WIDE) OUT
ZOOM CONTROL (TELE) OUT
ZOOM SPEED CONTROL IN
CN107
LENS CONNECTOR
1 AIC DRIVE OUT
2 GROUND
3 AIC DAMPER OUT
4 +1.8V OUT
5 +7.6V OUT (P.B:0V)
6 NOT USED
7 ZOOM CONTROL (TELE) OUT
8 ZOOM CONTROL (WIDE) OUT
9 GROUND (A/F)
10 Vs OUT
11 POWER FOCUS OUT
12 NOT USED
INT MIC BOARD
(YFVKZ 3230PBA)
CN5
1 AGC AUTO OUT
2 AGC SELECT IN
3 AGC MAN OUT
4 VTR COMPATIBILITY SW IN
5 +4.8V OUT (STANDBY 2:0V)
6 REC/FADE SWITCH IN
7 GROUND
CN6
1 GROUND
2 COLOR BALANCE IN
3 REC REVEW SWITCH IN
4 +4.8V IN (STANDBY 1 & 2:0V)
5 IRIS AUTO/MAN CONTROL IN
CN2
3 +4.8V OUT (STANDBY 1 & 2:0V)
2 GROUND
1 AIC SET OUT
CN002 is used for factory adjustment.
BI1
9 WHITE BALANCE SET SW IN
8 FADE SIGNAL OUT
7 REC SIGNAL OUT
6 LOW LIGHT SIGNAL OUT
5 BATTERY WARNING(1) OUT
4 TITLE COLOR SELECT IN
3 BATTERY WARNING(2) OUT
2 VTR COMPATIBILITY SW OUT
BI3
10 STANDBY IN
9 REC/FADE SWITCH OUT
8 REC REVEW SWITCH OUT
7 RED GAIN CONTROL IN
6 BLUE GAIN CONTROL IN
5 V. PULSE FOR TIMER IN
4 B-YL DETECTION OUT
3 R-YL DETECTION OUT
2 +1.8V OUT
1 +4.8V OUT (STANDBY 1 & 2:0V)
BI2
7 REC RESET IN
6 PLAYBACK CONTROL
5 EXT VIDEO IN
4 EXT TITLE POLARITY IN
3 NEGA/POSI CONTROL IN
2 TITLE COLOR CORRECTION IN
1 EXT TITLE CONTROL IN
CN8
1 +4.8V OUT (STANDBY 1 & 2:0V)
2 +12V OUT
3 +7.6V IN (STANDBY 1 & 2:0V)
4 +8.6V IN
5 +1.8V OUT
6 CHARACTER IN
7 EVF VIDEO OUT
8 TARGET VOLTAGE IN
9 BIAS LIGHT CORRECTION(-) IN
10 BIAS LIGHT CORRECTION(+) IN
CN7
1 PRE BL OUT
2 H1 OUT
3 LEVEL INDICATOR OUT
4 V1 OUT
5 DYNAMIC FOCUS OUT
6 LAG CORRECTION OUT
7 NOT USED
CN3
REC/FADE SWITCH IN 6
STANDBY OUT 5
+4.8V OUT (STANDBY 1 & 2: 0V) 4
AIC CONTROL OUT 3
+1.8V OUT 2
AUDIO FADE CONTROL OUT 1
CN4
PRE VIDEO IN 1
+7.6V OUT (STANDBY 1 & 2:0V) 2
TARGET VOLTAGE OUT 3
CN1
1 R-YL OUT
2 YL OUT
3 B-YL OUT
CN001 is used for factory adjustment.
PROCESS BOARD
(YFVKZ 4860P3A)
CN9
1 GROUND
2 VIDEO OUT(P.B VIDEO IN
CN 105
CAMERA REMOTE CONTROL CONNECTOR
CN1
1 POWER FOCUS OUT
2 +7.6V OUT (P.B:0V)
3 ZOOM CONTROL (TELE) OUT
4 ZOOM CONTROL (WIDE) OUT
5 GROUND (A/F)
6 +1.8V OUT
7 AIC DRIVE OUT
8 GROUND
9 AIC DAMPER IN
10 Vs OUT
CN2
5 Vs OUT
4 POWER FOCUS IN
3 REC/FADE SWITCH IN
2 ZOOM CONTROL (WIDE) IN
1 ZOOM CONTROL (TELE) IN
CN3
1 ZOOM CONTROL (TELE) IN
2 ZOOM CONTROL (WIDE) IN
BI1
REC/FADE SWITCH IN
+1.8V IN
AIC CONTROL IN
STANDBY IN
AUDIO FADE CONTROL IN
+4.8V IN (STANDBY 1 & 2:0V)
BI2
Vs IN
GROUND
+7.6V IN (STANDBY 1 & 2: 0V)
+7.6V IN (P.B 0V)
BEAM DETECT IN
CN5
3 EXT MIC CH1 (L) IN
2 AUDIO GROUND
1 INT MIC-L OUT
CN4
1 AUDIO GROUND
2 EXT MIC CH2 (R) IN
3 INT MIC-R OUT
CN6
1 AUDIO GROUND
2 INT MIC-L IN
3 INT MIC-R IN
EARPHONE BOARD
(YFVAKA0136AN)
EARPHONE
GROUND
EARPHONE
AUDIO/LENS CONTROL BOARD
(YFVKY 3230P5A)

WIRING DIAGRAM

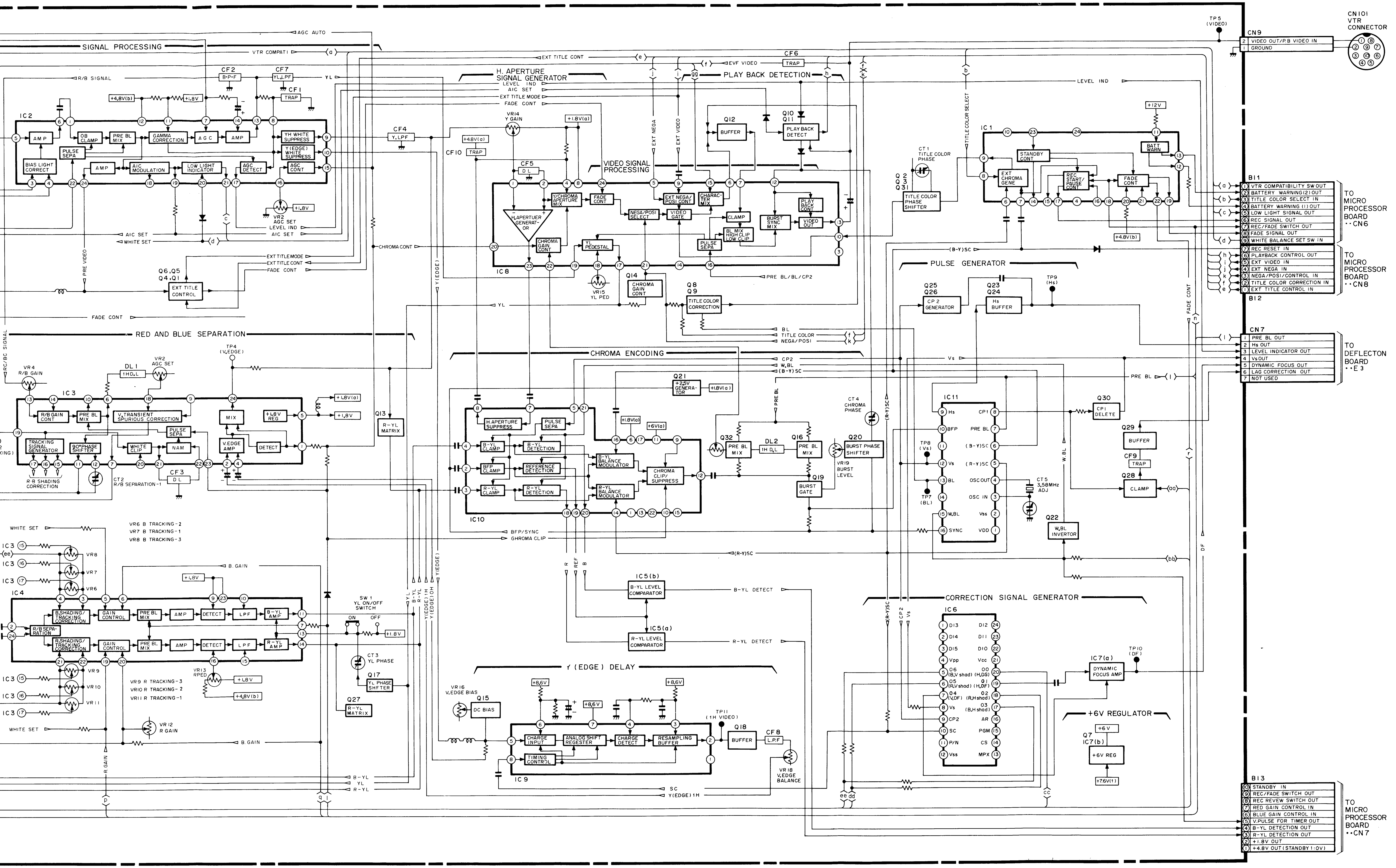


SW1 INDOOR/OUT DOOR SW
SW 2 WHITE SET SW
DISPLAY KEY BOARD [B] (YFVAKA0169AN)
DISPLAY KEY BOARD [A] (YFVAKA0170AN)
MICRO PROCESSOR BOARD (YFVKY 3230P4A)
MICRO PROCESSOR SUBBOARD (YFVPKA0714JA)
DEFLECTION BOARD (YFVKY 4860P1A)
CPU BACK-UP BATTERY 1.5V SUM-3NG
L101 DEFLECTION COIL FOR PICK-UP TUBE
PICK-UP TUBE
BIAS LIGHT ASSEMBLY
CN103 PICK-UP TUBE CONNECTOR
PREAMPLIFIER BOARD (YFVPKA0702JA)
BI1
4 TARGET VOLTAGE IN
3 +7.6V IN (STANDBY 1 & 2: 0V)
2 PRE VIDEO OUT
1 GROUND
1 H: +4.8V OUT (STANDBY 2:0V)
2 G4
3 G6
4 G5
5 G2
6 G1
7 K
8 H: +7.6V (STANDBY 1 & 2:0V)
CN5
GROUND 2
INDOOR/OUTDOOR SW IN 1
CN4
GROUND 2
WHITE SET SW IN 1
BI1
10 BUCK-UP BATT WARNING IN
9 VDD IN
8 BEAM DETECT IN
7 PLAY BACK CONTROL OUT
6 +5V IN
5 CPU RESET IN
4 +7.6V IN
3 CHARACTER OUT
2 H. SYNC IN
1 V. SYNC IN
CN3
1 SERIAL DATA IN/OUT
2 SERIAL CLOCK IN
3 VTR REC CONTROL IN
CN6
BEAM DETECT OUT 10
PLAY BACK CONTROL IN 9
V. SYNC OUT 8
CHARACTER IN 7
H. SYNC OUT 6
VDD OUT 5
CPU RESET OUT 4
BUCK-UP BATT WARNING OUT 3
+5V OUT 2
+7.6V OUT 1
CN4
+1.5V IN 2
GROUND 1
CN1
+7.6V IN (STANDBY 1 & 2:0V) 1
+7.6V IN (STANDBY 2:0V) 2
+7.6V OUT 3
+4.8V IN (STANDBY 2:0V) 4
+4.8V IN (STANDBY 1 & 2:0V) 5
GROUND 6
CN5
GROUND 1
+12V IN 2
CN2
GROUND 1
+4.8V OUT (STANDBY 1 & 2:0V) 2
EVF VIDEO OUT 3
H.D OUT 4
V. DEF(+) OUT 5
V. DEF(-) OUT 6
+7.6V OUT (STANDBY 2:0V) 7
+4.8V OUT (STANDBY 2:0V) 8
CN7
1 BEAM DETECT OUT
2 GROUND
3 +7.6V (P.B. 0V) OUT
4 V1 OUT
5 +7.6V OUT (STANDBY 1 & 2:0V)
CN3
1 H. DEF(-) OUT
2 H. DEF(+) OUT
3 THERMISTOR
4 V. DEF(-) OUT
5 V. DEF(+) OUT
CN8
2 BIAS LIGHT DC OUT
1 GROUND
BI1
6 H: +4.8V OUT (STANDBY 2:0V)
5 H: +7.6V OUT (STANDBY 1 & 2:0V)
4 K OUT
3 G1 OUT
2 G2 OUT
1 G4 OUT
G6
G5
E2
E3
CN1
CN2
CN6
CN7
CN8
E1
CN 105 CAMERA REMOTE CONTROL CONNECTOR
EARPHONE BOARD (YFVAKA0136AN)
3 EARPHONE CH1 (L) IN
2 GROUND
1 EARPHONE CH2 (R) IN
CN101 VTR CONNECTOR
1 VIDEO OUT/PLAY BACK VIDEO IN
2 GROUND FOR PIN ①
3 SERIAL DATA IN/OUT
4 SERIAL CLOCK IN
5 AUDIO CH2 (R) OUT/STANDBY OUT
6 VTR REC CONTROL OUT
7 AUDIO CH1 (L) OUT
8 AUDIO GROUND
9 GROUND
10 +12V IN
CN002 is used for factory adjustment.
CN001 is used for factory adjustment.
PROCESS BOARD (YFVKZ 4860P3A)
CN6
CN2
BI3
BI2
CN8
CN7
CN1
1 R-YL OUT
2 YL OUT
3 B-YL OUT
CN9
1 GROUND
2 VIDEO OUT (P.B VIDEO IN)
CN5
3 EXT MIC CH1 (L) IN
2 AUDIO GROUND
1 INT MIC-L OUT
CN6
1 AUDIO GROUND
2 INT MIC-L IN
3 INT MIC-R IN
CN4
1 AUDIO GROUND
2 EXT MIC CH2 (R) IN
3 INT MIC-R OUT
AUDIO/LENS CONTROL BOARD (YFVKY 3230P5A)
CN8
3 EARPHONE CH1 (L) OUT
2 EARPHONE CH2 (R) OUT
1 GROUND
CN007
1 AUDIO GROUND
2 AUDIO CH2 (R) OUT/STANDBY OUT
3 AUDIO CH1 (L) OUT
FADE/AGC SWITCH BOARD (YFVKZ3230P8A)
BI1
3 GROUND
2 REC SWITCH IN
1 ZOOM SPEED CONTROL OUT
BI3
4 SERIAL DATA OUT
3 SERIAL CLOCK OUT
2 SERIAL CLOCK IN
1 SERIAL DATA IN
BI2
CN201
VTR REC CONTROL OUT 3
SERIAL CLOCK OUT 2
SERIAL DATA OUT 1

BLOCK DIAGRAM OF PROCESS BOARD (YFVKZ4860P3A)

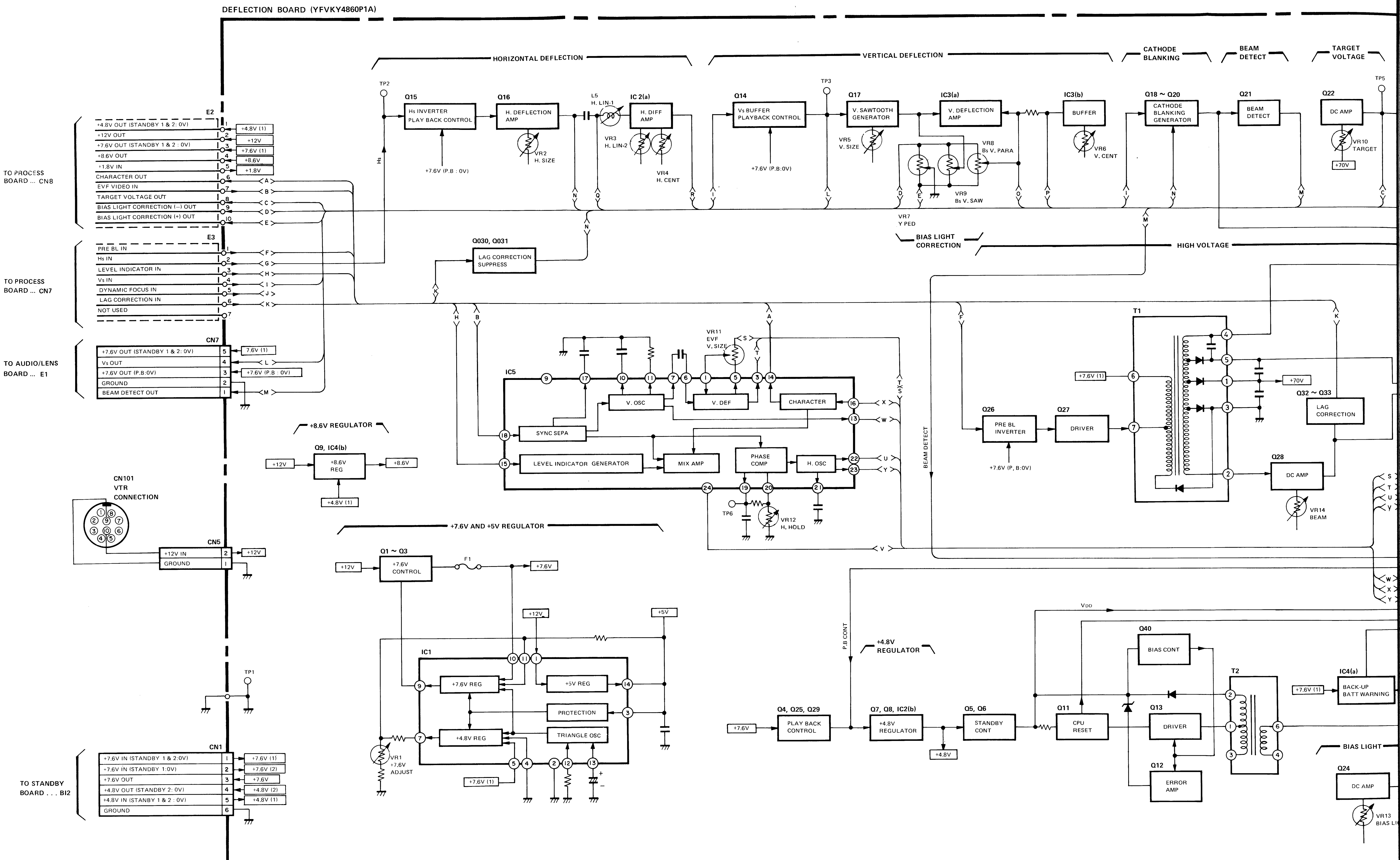

PROCESS BOARD (YFVKZ4860P3A)
CN5
AGC AUTO OUT
AGC SELECT IN
AGC MAN OUT
VTR COMPATIBILITY SW IN
+4.8V OUT (STANDBY 1&2:0V)
REC/FADE SWITCH IN
GROUND
VR1 MANUAL GAIN
AGC AUTO
SIGNAL PROCESSING
VTR COMPATI
R/B SIGNAL
CF2 B.P.F
CF7 YL.L.PF
CF1 TRAP
YL
TP1 (PREAMP OUT)
TO PREAMP BOARD
CN4
PRE VIDEO IN
+7.6V OUT (STANDBY 1&2:0V)
TARGET VOLTAGE OUT
IC2
AMP
OB CLAMP
PRE BL MIX
GAMMA CORRECTION
AGC
AMP
YH WHITE SUPPRESS
Y(EDGE) WHITE SUPPRESS
AGC CONT
AGC DETECT
PULSE SEPA
BIAS LIGHT CORRECT
AIC MODULATION
LOW LIGHT INDICATOR
TO DEFLECTION BOARD ··E2
CN8
BIAS LIGHT CORRECTION(+) IN
BIAS LIGHT CORRECTION(-) IN
TARGET VOLTAGE IN
EVF VIDEO OUT
CHARACTER IN
+1.8V OUT
+8.6V IN
+7.6V IN (STANDBY 1&2:0V)
+12V OUT
+4.8V IN (STANDBY 1&2:0V)
VR2 AGC SET
LEVEL IND
AIC SET
WHITE SET
EXT TITLE MODE
EXT TITLE CONT
FADE CONT
PRE VIDEO
Q6,Q5 Q4,Q1 EXT TITLE CONTROL
TP11 (GROUND)
REC SWITCH BOARD (YWV3100ZR07)
SW701 REC SW
ZOOM SWITCH BOARD (YFVPRA0709JA)
B12
VTR COMPATIBILITY SW OUT
AGC SELECT OUT
AGC MAN IN
AGC AUTO IN
GROUND
+4.8V IN (STANDBY 1&2:0V)
REC/FADE SWITCH OUT
SW4 AGC SW
SW3 FADE
SW2 ZOOM SPEED
SLOW FAST
RUN
B11
GROUND
REC SWITCH OUT
ZOOM SPEED CONT OUT
SW1 ZOOM CONT (TELE)
SW2 ZOOM CONT (WIDE)
TO AUDIO/LENS CONTROL
B13
SERIAL DATA IN
SERIAL CLOCK IN
SERIAL CLOCK OUT
SERIAL DATA OUT
TO MICRO PROCESSOR ··CN3
TO CN101 VTR CONNECTOR
SW1 VTR COMPATIBILITY SW
FADE/AGC SWITCH BOARD (YFVPZ3230P8A)
FADE CONT
RED AND BLUE SEPARATION
R/BC SIGNAL
TP4 (V.EDGE)
VR4 R/B GAIN
DL1 1H D.L
VR2 AGC SET
IC3
R/B GAIN CONT
PRE BL MIX
V.TRANSIENT SPURIOUS CORRECTION
MIX
+1.8V REG
PULSE SEPA
TRACKING SIGNAL GENERATOR
90°PHASE SHIFTER
WHITE CLIP
NAM
V.EDGE AMP
DETECT
R-B SHADING CORRECTION
CT2 R/B SEPARATION-1
CF3 D.L
TP2 (TRACKING)
Q13 R-YL MATRIX
AIC SET
VR3 AIC SET
WHITE SET
VR6 B TRACKING-2
VR7 B TRACKING-1
VR8 B TRACKING-3
B.GAIN
IC4
B.SHADING/TRACKING CORRECTION
GAIN CONTROL
PRE BL MIX
AMP
DETECT
LPF
B-YL AMP
R/B SEPARATION
R.SHADING/TRACKING CORRECTION
R-YL AMP
VR9 R TRACKING-3
VR10 R TRACKING-2
VR11 R TRACKING-1
VR13 RPED
VR12 R GAIN
R GAIN
REC/FADE SW
SW1 YL ON/OFF SWITCH
ON OFF
CT3 YL PHASE
Q17 YL PHASE SHFTER
Q27 R-YL MATRIX
CN2 is used for factory adjustment
CN2
AIC SET OUT
GROUND
+4.8V OUT (STANDBY 1:0V)
TO AUDIO BOARD ··B11
CN3
AUDIO FADE CONTROL IN
+1.8V OUT
AIC CONTROL OUT
+4.8V OUT (STANDBY 1&2:0V)
STANDBY OUT
REC/FADE SWITCH IN
TO STANDBY BOARD ··B11
CN6
IRIS AUTO/MAN CONTROL IN
+4.8V OUT (STANDBY 1:0V)
REC REVEW SWITCH IN
COLOR BALANCE IN
GROUND
CN1 is used for factory adjustment
CN1
B-YL OUT
YL OUT
R-YL OUT
B-YL
YL
R-YL
EXT TITLE CONT
EVF VIDEO
CF6 TRAP
PLAY BACK DETECTION
H. APERTURE SIGNAL GENERATOR
LEVEL IND
AIC SET
EXT TITLE MODE
FADE CONT
CF4 Y.LPF
CF10 TRAP
VR14 Y GAIN
EXT NEGA
EXT VIDEO
Q12 BUFFER
Q10 Q11 PLAY BACK DETECT
CT1 TITLE COLOR PHASE
Q30 Q31 TITLE COLOR PHASE SHIFTER
VIDEO SIGNAL PROCESSING
CF5 D.L
H.APERTUER GENERATOR
Y/CHROMA APERTURE MIX
FADE CONT
NEGA/POSI SELECT
EXT NEGA/POSI CONT
VIDEO GATE
CHARACTER MIX
CLAMP
BURST SYNC MIX
PLAY BACK CONT
VIDEO OUT
BL MIX HIGH CLIP LOW CLIP
PULSE SEPA
CHROMA GAIN CONT
YL PEDESTAL
IC8
CHROMA CONT
Y(EDGE)
PRE BL/BL/CP2
Q14 CHROMA GAIN CONT
VR15 YL PED
Q8 Q9 TITLE COLOR CORRECTION
BL
TITLE COLOR
NEGA/POSI
Q25 Q26 CP2 GENERATOR
PULSE
CHROMA ENCODING
CP2
W.BL
(B-Y)SC
Q21 +2.5V GENERATOR
PRE BL
H APERTURE SUPPRESS
PULSE SEPA
B-YL CLAMP
BFP CLAMP
R-YL CLAMP
B-YL DETECTION
REFERENCE DETECTION
R-YL DETECTION
B-YL BALANCE MODULATOR
R-YL BALANCE MODULATOR
CHROMA CLIP/SUPPRESS
IC10
Q32 PRE BL MIX
DL2 1H D.L
Q16 PRE BL MIX
CT4 CHROMA PHASE
Q20 BURST PHASE SHIFTER
VR19 BURST LEVEL
Q19 BURST GATE
TP8 (Vs)
TP7 (BL)
BFP/SYNC
CHROMA CLIP
(R-Y)SC
R REF B
IC5(b) B-YL LEVEL COMPARATOR
B-YL DETECT
IC5(a) R-YL LEVEL COMPARATOR
R-YL DETECT
Y(EDGE)1H
Y(EDGE) DELAY
VR16 V.EDGE BIAS
Q15 DC BIAS
IC9
CHARGE INPUT
ANALOG SHIFT REGESTER
CHARGE DETECT
RESAMPLING BUFFER
TIMING CONTROL
TP11 (1H VIDEO)
Q18 BUFFER
CF8 L.P.F
VR18 V.EDGE BALANCE
SC
Y(EDGE)1H

BLOCK DIAGRAM OF PROCESS BOARD (YFVKZ4860P3A)

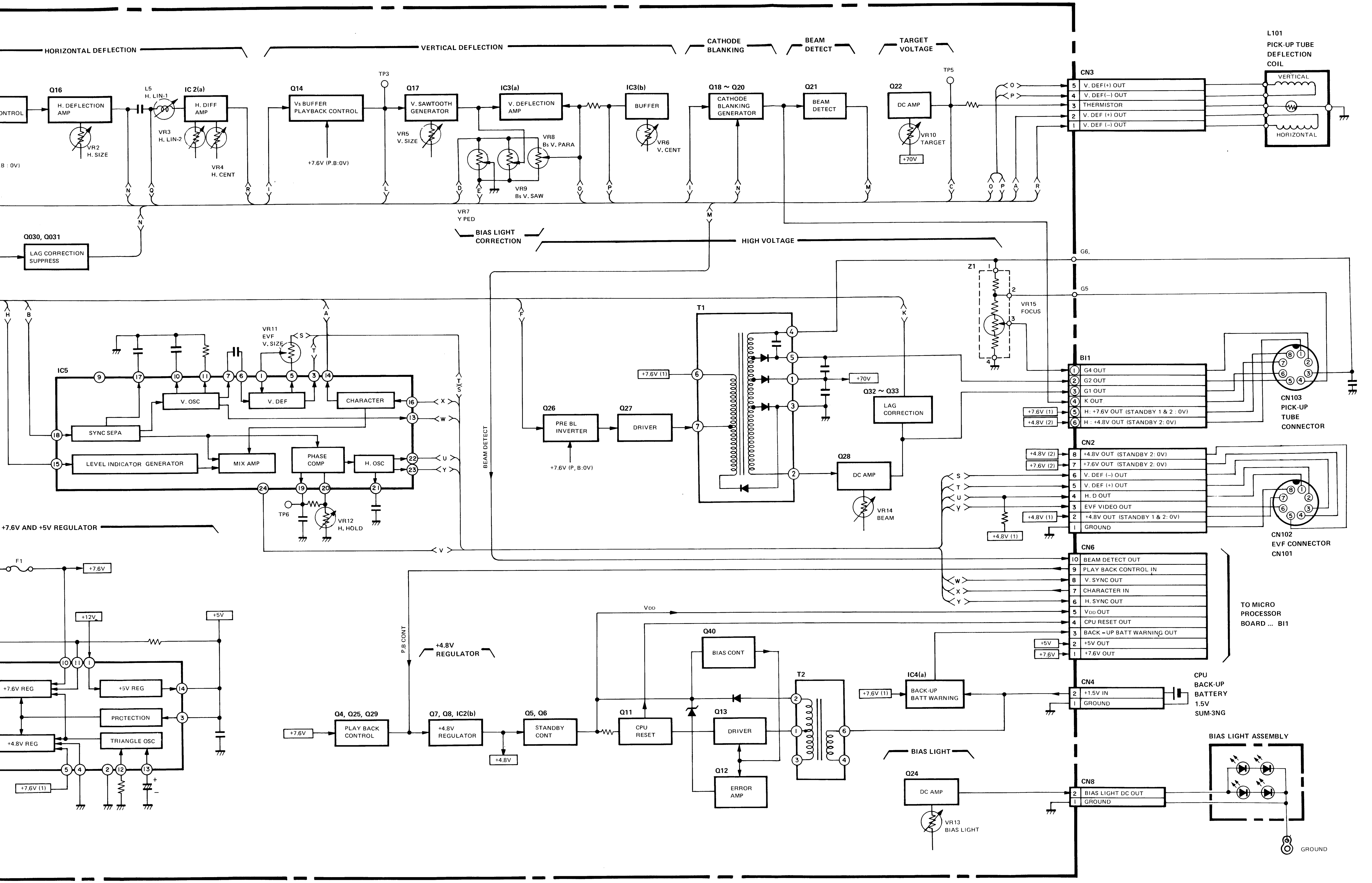


SIGNAL PROCESSING
AGC AUTO
VTR COMPATI
R/B SIGNAL
CF2
B·P·F
CF7
YL.LPF
YL
CF1
TRAP
+4.8V(b)
+1.8V
IC2
AMP
OB CLAMP
PRE BL MIX
GAMMA CORRECTION
AGC
AMP
YH WHITE SUPPRESS
Y(EDGE) WHITE SUPPRESS
PULSE SEPA
BIAS LIGHT CORRECT
AMP
AIC MODULATION
LOW LIGHT INDICATOR
AGC DETECT
AGC CONT
VR2 AGC SET
LEVEL IND
AIC SET
AIC SET
WHITE SET
PRE VIDEO
Q6,Q5 Q4,Q1
EXT TITLE CONTROL
EXT TITLE MODE
EXT TITLE CONT
FADE CONT
FADE CONT
CF4
Y.LPF
CF10
TRAP
+4.8V(a)
H. APERTURE SIGNAL GENERATOR
LEVEL IND
AIC SET
EXT TITLE MODE
FADE CONT
EXT TITLE CONT
VR14 Y GAIN
+1.8V(a)
CF5
DL
H.APERTUER GENERAT-OR
Y/CHROMA APERTURE MIX
FADE CONT
CHROMA GAIN CONT
YL PEDESTAL
CHROMA CONT
IC8
VR15 YL PED
Q14
CHROMA GAIN CONT
VIDEO SIGNAL PROCESSING
NEGA/POSI SELECT
EXT NEGA/ POSI CONT
VIDEO GATE
CHARAC-TER MIX
CLAMP
PULSE SEPA
BL MIX HIGH CLIP LOW CLIP
BURST SYNC MIX
PLAY BACK CONT
VIDEO OUT
EXT NEGA
EXT VIDEO
PRE BL/BL/CP2
Q8 Q9
TITLE COLOR CORRECTION
BL
TITLE COLOR
NEGA/POSI
EVF VIDEO
CF6
TRAP
PLAY BACK DETECTION
Q12
BUFFER
Q10 Q11
PLAY BACK DETECT
LEVEL IND
TP5 (VIDEO)
CN9
VIDEO OUT/P.B VIDEO IN
GROUND
CN101 VTR CONNECTOR
TITLE COLOR SELECT
CT1 TITLE COLOR PHASE
Q2 Q3 Q31
TITLE COLOR PHASE SHIFTER
IC1
+12V
BATT WARN
STANDBY CONT
EXT CHROMA GENE
REC START/ PAUSE CONT
FADE CONT
+4.8V(b)
B11
VTR COMPATIBILITY SW OUT
BATTERY WARNING(2) OUT
TITLE COLOR SELECT IN
BATTERY WARNING (1) OUT
LOW LIGHT SIGNAL OUT
REC SIGNAL OUT
REC/FADE SWITCH OUT
FADE SIGNAL OUT
WHITE BALANCE SET SW IN
TO MICRO PROCESSOR BOARD ··CN6
REC RESET IN
PLAYBACK CONTROL OUT
EXT VIDEO IN
EXT NEGA IN
NEGA/POSI/CONTROL IN
TITLE COLOR CORRECTION IN
EXT TITLE CONTROL IN
B12
TO MICRO PROCESSOR BOARD ··CN8
(B-Y)SC
PULSE GENERATOR
Q25 Q26
CP2 GENERATOR
Q23 Q24
Hs BUFFER
TP9 (Hs)
FADE CONT
CN7
PRE BL OUT
Hs OUT
LEVEL INDICATOR OUT
Vs OUT
DYNAMIC FOCUS OUT
LAG CORRECTION OUT
NOT USED
TO DEFLECTON BOARD ··E3
RED AND BLUE SEPARATION
TP4 (V.EDGE)
VR4 R/B GAIN
DL1
1H D.L
VR2 AGC SET
IC3
R/B GAIN CONT
PRE BL MIX
V.TRANSIENT SPURIOUS CORRECTION
MIX
+1.8V REG.
+1.8V(a)
+1.8V
V.EDGE AMP
DETECT
TRACKING SIGNAL GENERATOR
90°PHASE SHIFTER
WHITE CLIP
PULSE SEPA
NAM
R-B SHADING CORRECTION
CT2 R/B SEPARATION-1
CF3
DL
Q13
R-YL MATRIX
CHROMA ENCODING
CP2
W.BL
(B-Y)SC
Q21
+2.5V GENERA-TOR
+1.8V(a)
H.APERTURE SUPPRESS
PULSE SEPA
+6V(a)
B-YL CLAMP
B-YL DETECTION
BFP CLAMP
REFERENCE DETECTION
R-YL CLAMP
R-YL DETECTION
B-YL BALANCE MODULATOR
R-YL BALANCE MODULATOR
CHROMA CLIP/ SUPPRESS
IC10
PRE BL
Q32
PRE BL MIX
DL2
1H D.L
Q16
PRE BL MIX
Q19
BURST GATE
CT4 CHROMA PHASE
Q20
BURST PHASE SHIFTER
VR19 BURST LEVEL
(R-Y)SC
Vs
PRE BL
IC11
Hs
BFP
Vs
BL
W.BL
SYNC
CP1
PRE BL
(B-Y)SC
(R-Y)SC
OSC OUT
OSC IN
Vss
VDD
TP8 (Vs)
TP7 (BL)
CT5 3.58MHz ADJ
Q30
CP1 DELETE
Q29
BUFFER
CF9
TRAP
Q28
CLAMP
Q22
W.BL INVERTOR
W.BL
DF
WHITE SET
VR6 B TRACKING-2
VR7 B TRACKING-1
VR8 B TRACKING-3
BFP/SYNC
CHROMA CLIP
(R-Y)SC
R
REF
B
IC5(b)
B-YL LEVEL COMPARATOR
B-YL DETECT
IC5(a)
R-YL LEVEL COMPARATOR
R-YL DETECT
IC3
B. GAIN
+1.8V
IC4
R/B SEPA-RATION
B.SHADING/ TRACKING CORRECTION
GAIN CONTROL
PRE BL MIX
AMP
DETECT
LPF
B-YL AMP
R.SHADING/ TRACKING CORRECTION
GAIN CONTROL
PRE BL MIX
AMP
DETECT
LPF
R-YL AMP
VR9
VR10
VR11
VR13 RPED
+1.8V
+4.8V(b)
VR9 R TRACKING-3
VR10 R TRACKING-2
VR11 R TRACKING-1
VR12 R GAIN
B. GAIN
R GAIN
YL
B-YL
R-YL
Y(EDGE) 1H
Y(EDGE) 0H
Y(EDGE)
SW1 YL ON/OFF SWITCH
ON
OFF
+1.8V
CT3 YL PHASE
Q17
YL PHASE SHFTER
Q27
R-YL MATRIX
B-YL
YL
R-YL
Y (EDGE) DELAY
VR16 V.EDGE BIAS
Q15
DC BIAS
+8.6V
+8.6V
+8.6V
CHARGE INPUT
ANALOG SHIFT REGESTER
CHARGE DETECT
RESAMPLING BUFFER
TIMING CONTR'L
IC9
TP11 (1H VIDEO)
Q18
BUFFER
CF8
L.P.F
VR18 V.EDGE BALANCE
SC
Y(EDGE) 1H
CORRECTION SIGNAL GENERATOR
IC6
(R-Y)SC
CP2
Vs
DI3
DI4
DI5
Vpp
O6 (B,V shad)
O5 (R,V shad)
O4 (V,DF)
Vs
CP2
SC
P/N
Vss
DI2
DI1
DI0
Vcc
O0 (H,DS)
O1 (H,DF)
O2 (R,H shad)
O3 (B,H shad)
AR
PGM
CS
MPX
IC7(a)
DYNAMIC FOCUS AMP
TP10 (DF)
+6V REGULATOR
Q7 IC7(b)
+6V
+6V REG
+7.6V(1)
B13
STANDBY IN
REC/FADE SWITCH OUT
REC REVEW SWITCH OUT
RED GAIN CONTROL IN
BLUE GAIN CONTROL IN
V.PULSE FOR TIMER OUT
B-YL DETECTION OUT
R-YL DETECTION OUT
+1.8V OUT
+4.8V OUT (STANDBY 1:0V)
TO MICRO PROCESSOR BOARD ··CN7

BLOCK DIAGRAM OF DEFLECTION BOARD (YFVKY4860P1A)

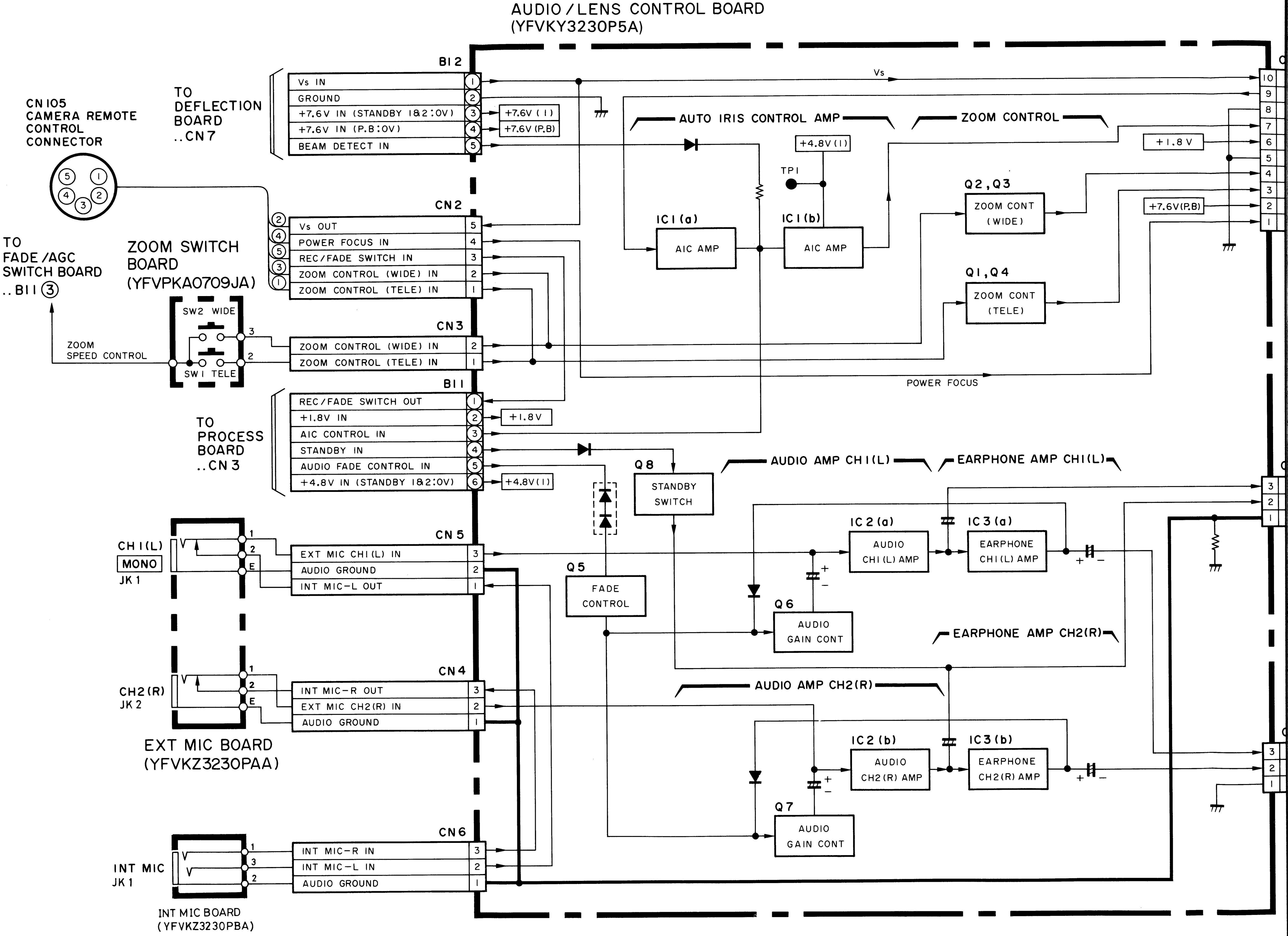

DEFLECTION BOARD (YFVKY4860P1A)
HORIZONTAL DEFLECTION
VERTICAL DEFLECTION
CATHODE BLANKING
BEAM DETECT
TARGET VOLTAGE
TO PROCESS BOARD ... CN8
E2
+4.8V OUT (STANDBY 1 & 2: 0V)
+12V OUT
+7.6V OUT (STANDBY 1 & 2 : 0V)
+8.6V OUT
+1.8V IN
CHARACTER OUT
EVF VIDEO IN
TARGET VOLTAGE OUT
BIAS LIGHT CORRECTION (–) OUT
BIAS LIGHT CORRECTION (+) OUT
+4.8V (1)
+12V
+7.6V (1)
+8.6V
+1.8V
TO PROCESS BOARD ... CN7
E3
PRE BL IN
Hs IN
LEVEL INDICATOR IN
Vs IN
DYNAMIC FOCUS IN
LAG CORRECTION IN
NOT USED
TO AUDIO/LENS BOARD ... E1
CN7
+7.6V OUT (STANDBY 1 & 2: 0V)
Vs OUT
+7.6V OUT (P.B:0V)
GROUND
BEAM DETECT OUT
7.6V (1)
+7.6V (P.B : 0V)
CN101 VTR CONNECTION
CN5
+12V IN
GROUND
+12V
TP1
TO STANDBY BOARD . . . BI2
CN1
+7.6V IN (STANDBY 1 & 2:0V)
+7.6V IN (STANDBY 1:0V)
+7.6V OUT
+4.8V OUT (STANDBY 2: 0V)
+4.8V IN (STANBY 1 & 2 : 0V)
GROUND
+7.6V (1)
+7.6V (2)
+7.6V
+4.8V (2)
+4.8V (1)
TP2
Hs
Q15
Hs INVERTER PLAY BACK CONTROL
+7.6V (P.B : 0V)
Q16
H. DEFLECTION AMP
VR2 H. SIZE
L5 H. LIN-1
VR3 H. LIN-2
IC 2(a)
H. DIFF AMP
VR4 H. CENT
Q030, Q031
LAG CORRECTION SUPPRESS
Q14
Vs BUFFER PLAYBACK CONTROL
+7.6V (P.B:0V)
TP3
Q17
V. SAWTOOTH GENERATOR
VR5 V. SIZE
IC3(a)
V. DEFLECTION AMP
VR8 Bs V. PARA
VR9 Bs V. SAW
VR7 Y PED
IC3(b)
BUFFER
VR6 V. CENT
BIAS LIGHT CORRECTION
Q18 ~ Q20
CATHODE BLANKING GENERATOR
Q21
BEAM DETECT
Q22
DC AMP
TP5
VR10 TARGET
+70V
HIGH VOLTAGE
+8.6V REGULATOR
Q9, IC4(b)
+8.6V REG
+12V
+8.6V
+4.8V (1)
IC5
VR11 EVF V. SIZE
V. OSC
V. DEF
CHARACTER
SYNC SEPA
LEVEL INDICATOR GENERATOR
MIX AMP
PHASE COMP
H. OSC
TP6
VR12 H. HOLD
BEAM DETECT
T1
+7.6V (1)
+70V
Q26
PRE BL INVERTER
+7.6V (P, B:0V)
Q27
DRIVER
Q32 ~ Q33
LAG CORRECTION
Q28
DC AMP
VR14 BEAM
+7.6V AND +5V REGULATOR
Q1 ~ Q3
+7.6V CONTROL
F1
+7.6V
+12V
+5V
IC1
+7.6V REG
+5V REG
PROTECTION
+4.8V REG
TRIANGLE OSC
VR1 +7.6V ADJUST
+7.6V (1)
P.B CONT
+4.8V REGULATOR
VDD
+7.6V
Q4, Q25, Q29
PLAY BACK CONTROL
Q7, Q8, IC2(b)
+4.8V REGULATOR
+4.8V
Q5, Q6
STANDBY CONT
Q11
CPU RESET
Q40
BIAS CONT
Q13
DRIVER
Q12
ERROR AMP
T2
IC4(a)
+7.6V (1)
BACK-UP BATT WARNING
BIAS LIGHT
Q24
DC AMP
VR13 BIAS LI

BLOCK DIAGRAM OF DEFLECTION BOARD (YFVKY4860P1A)

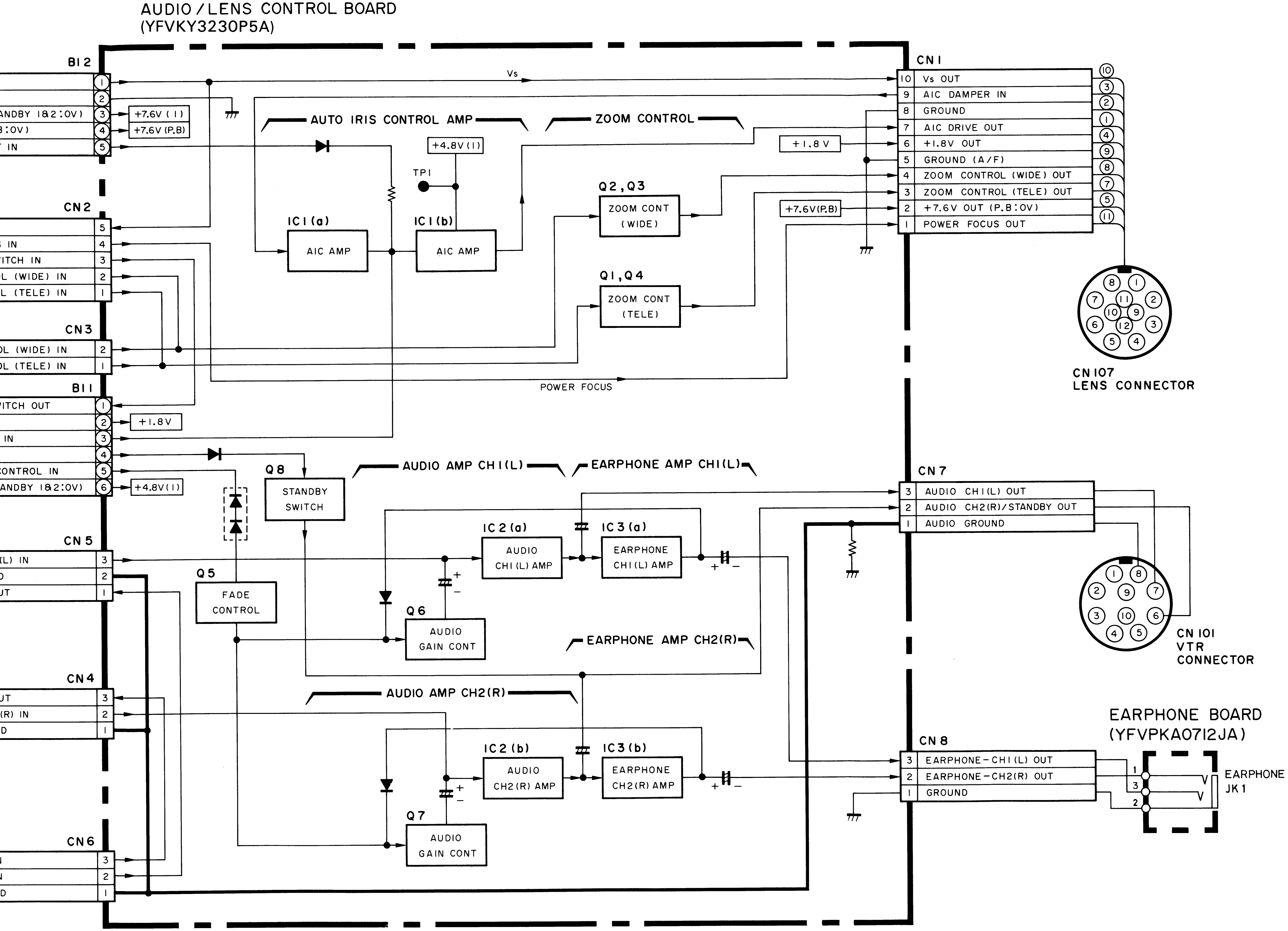


HORIZONTAL DEFLECTION
VERTICAL DEFLECTION
CATHODE BLANKING
BEAM DETECT
TARGET VOLTAGE
ONTROL
B : 0V)
Q16
H. DEFLECTION AMP
VR2 H. SIZE
L5 H. LIN-1
VR3 H. LIN-2
IC 2(a)
H. DIFF AMP
VR4 H. CENT
Q14
Vs BUFFER PLAYBACK CONTROL
+7.6V (P.B:0V)
TP3
Q17
V. SAWTOOTH GENERATOR
VR5 V. SIZE
IC3(a)
V. DEFLECTION AMP
VR8 Bs V. PARA
VR9 Bs V. SAW
VR7 Y PED
IC3(b)
BUFFER
VR6 V. CENT
Q18 ~ Q20
CATHODE BLANKING GENERATOR
Q21
BEAM DETECT
Q22
DC AMP
VR10 TARGET
+70V
TP5
CN3
5 V. DEF(+) OUT
4 V. DEF(–) OUT
3 THERMISTOR
2 V. DEF (+) OUT
1 V. DEF (–) OUT
L101
PICK-UP TUBE DEFLECTION COIL
VERTICAL
HORIZONTAL
BIAS LIGHT CORRECTION
HIGH VOLTAGE
Q030, Q031
LAG CORRECTION SUPPRESS
G6
G5
Z1
VR15 FOCUS
T1
+7.6V (1)
+70V
Q32 ~ Q33
LAG CORRECTION
Q26
PRE BL INVERTER
+7.6V (P, B:0V)
Q27
DRIVER
Q28
DC AMP
VR14 BEAM
BEAM DETECT
IC5
VR11 EVF V. SIZE
V. OSC
V. DEF
CHARACTER
SYNC SEPA
LEVEL INDICATOR GENERATOR
MIX AMP
PHASE COMP
H. OSC
TP6
VR12 H. HOLD
BI1
1 G4 OUT
2 G2 OUT
3 G1 OUT
4 K OUT
5 H: +7.6V OUT (STANDBY 1 & 2 : 0V)
6 H : +4.8V OUT (STANDBY 2: 0V)
CN103
PICK-UP TUBE CONNECTOR
CN2
8 +4.8V OUT (STANDBY 2: 0V)
7 +7.6V OUT (STANDBY 2: 0V)
6 V. DEF (–) OUT
5 V. DEF (+) OUT
4 H. D OUT
3 EVF VIDEO OUT
2 +4.8V OUT (STANDBY 1 & 2: 0V)
1 GROUND
+4.8V (2)
+7.6V (2)
+7.6V (1)
+4.8V (1)
CN102
EVF CONNECTOR
CN101
+7.6V AND +5V REGULATOR
F1
+7.6V
+12V
+5V
+7.6V REG
+5V REG
PROTECTION
+4.8V REG
TRIANGLE OSC
+7.6V (1)
P.B CONT
+4.8V REGULATOR
Q4, Q25, Q29
PLAY BACK CONTROL
Q7, Q8, IC2(b)
+4.8V REGULATOR
+4.8V
Q5, Q6
STANDBY CONT
VDD
Q11
CPU RESET
Q40
BIAS CONT
Q13
DRIVER
Q12
ERROR AMP
T2
IC4(a)
BACK-UP BATT WARNING
CN6
10 BEAM DETECT OUT
9 PLAY BACK CONTROL IN
8 V. SYNC OUT
7 CHARACTER IN
6 H. SYNC OUT
5 VDD OUT
4 CPU RESET OUT
3 BACK – UP BATT WARNING OUT
2 +5V OUT
1 +7.6V OUT
TO MICRO PROCESSOR BOARD ... BI1
CN4
2 +1.5V IN
1 GROUND
CPU BACK-UP BATTERY 1.5V SUM-3NG
BIAS LIGHT
Q24
DC AMP
VR13 BIAS LIGHT
CN8
2 BIAS LIGHT DC OUT
1 GROUND
BIAS LIGHT ASSEMBLY
GROUND

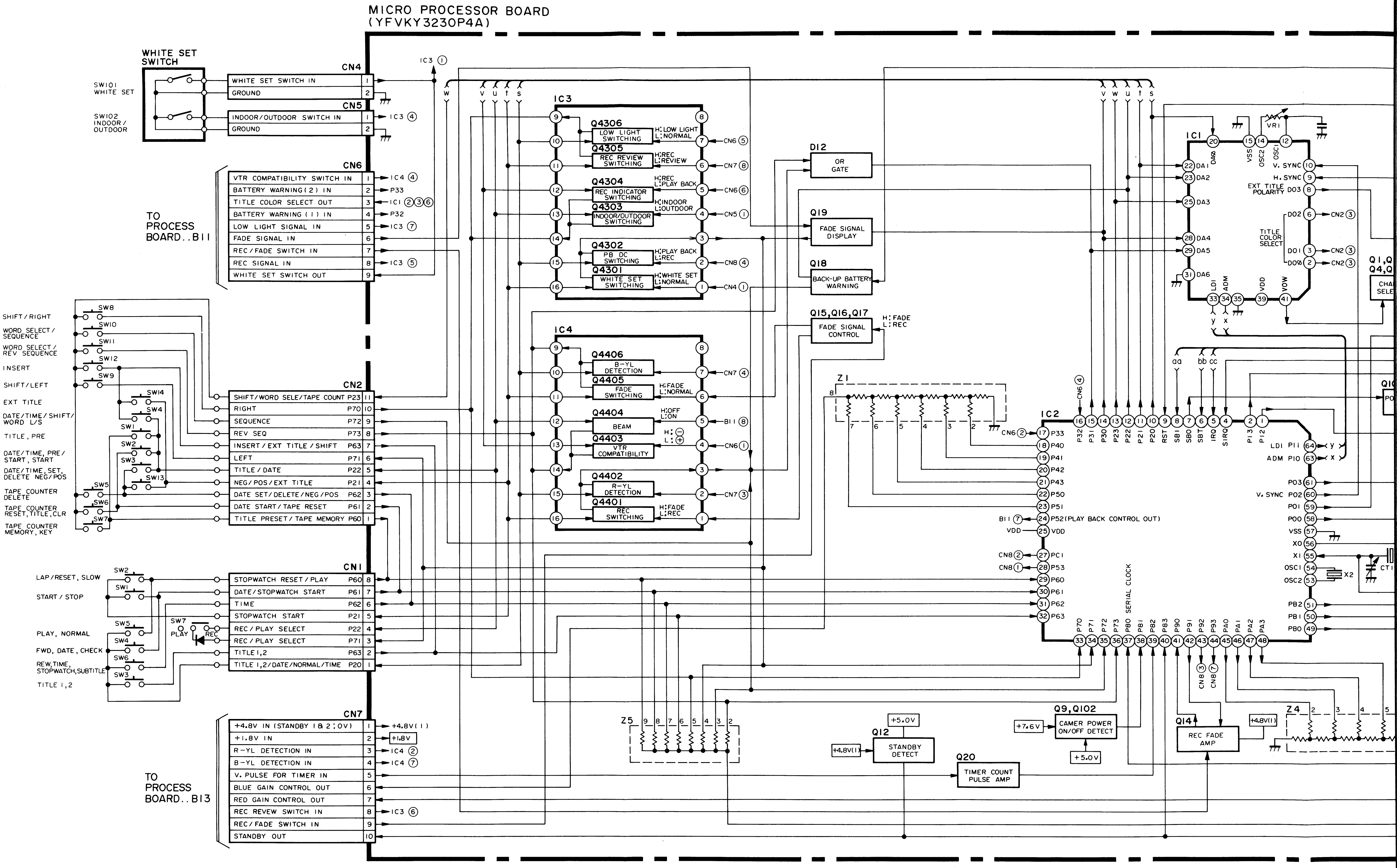
BLOCK DIAGRAM OF AUDIO/LENS CONTROL BOARD (YFVKY3230P5A)


AUDIO / LENS CONTROL BOARD
(YFVKY3230P5A)
CN105
CAMERA REMOTE
CONTROL
CONNECTOR
TO
DEFLECTION
BOARD
..CN7
B12
Vs IN
GROUND
+7.6V IN (STANDBY 1&2:0V)
+7.6V IN (P.B:0V)
BEAM DETECT IN
+7.6V (1)
+7.6V (P.B)
Vs
AUTO IRIS CONTROL AMP
ZOOM CONTROL
+4.8V (1)
TP1
+1.8V
+7.6V(P.B)
CN2
Vs OUT
POWER FOCUS IN
REC/FADE SWITCH IN
ZOOM CONTROL (WIDE) IN
ZOOM CONTROL (TELE) IN
IC1 (a)
AIC AMP
IC1 (b)
AIC AMP
Q2, Q3
ZOOM CONT
(WIDE)
Q1, Q4
ZOOM CONT
(TELE)
TO
FADE/AGC
SWITCH BOARD
..B11 ③
ZOOM SWITCH
BOARD
(YFVPKA0709JA)
SW2 WIDE
SW1 TELE
ZOOM
SPEED CONTROL
CN3
ZOOM CONTROL (WIDE) IN
ZOOM CONTROL (TELE) IN
POWER FOCUS
B11
TO
PROCESS
BOARD
..CN3
REC/FADE SWITCH OUT
+1.8V IN
AIC CONTROL IN
STANDBY IN
AUDIO FADE CONTROL IN
+4.8V IN (STANDBY 1&2:0V)
+1.8V
+4.8V(1)
Q8
STANDBY
SWITCH
AUDIO AMP CH1(L)
EARPHONE AMP CH1(L)
CH1(L)
MONO
JK1
CN5
EXT MIC CH1(L) IN
AUDIO GROUND
INT MIC-L OUT
Q5
FADE
CONTROL
IC2 (a)
AUDIO
CH1(L) AMP
IC3 (a)
EARPHONE
CH1(L) AMP
Q6
AUDIO
GAIN CONT
EARPHONE AMP CH2(R)
AUDIO AMP CH2(R)
CH2(R)
JK2
CN4
INT MIC-R OUT
EXT MIC CH2(R) IN
AUDIO GROUND
EXT MIC BOARD
(YFVKZ3230PAA)
IC2 (b)
AUDIO
CH2(R) AMP
IC3 (b)
EARPHONE
CH2(R) AMP
Q7
AUDIO
GAIN CONT
INT MIC
JK1
CN6
INT MIC-R IN
INT MIC-L IN
AUDIO GROUND
INT MIC BOARD
(YFVKZ3230PBA)

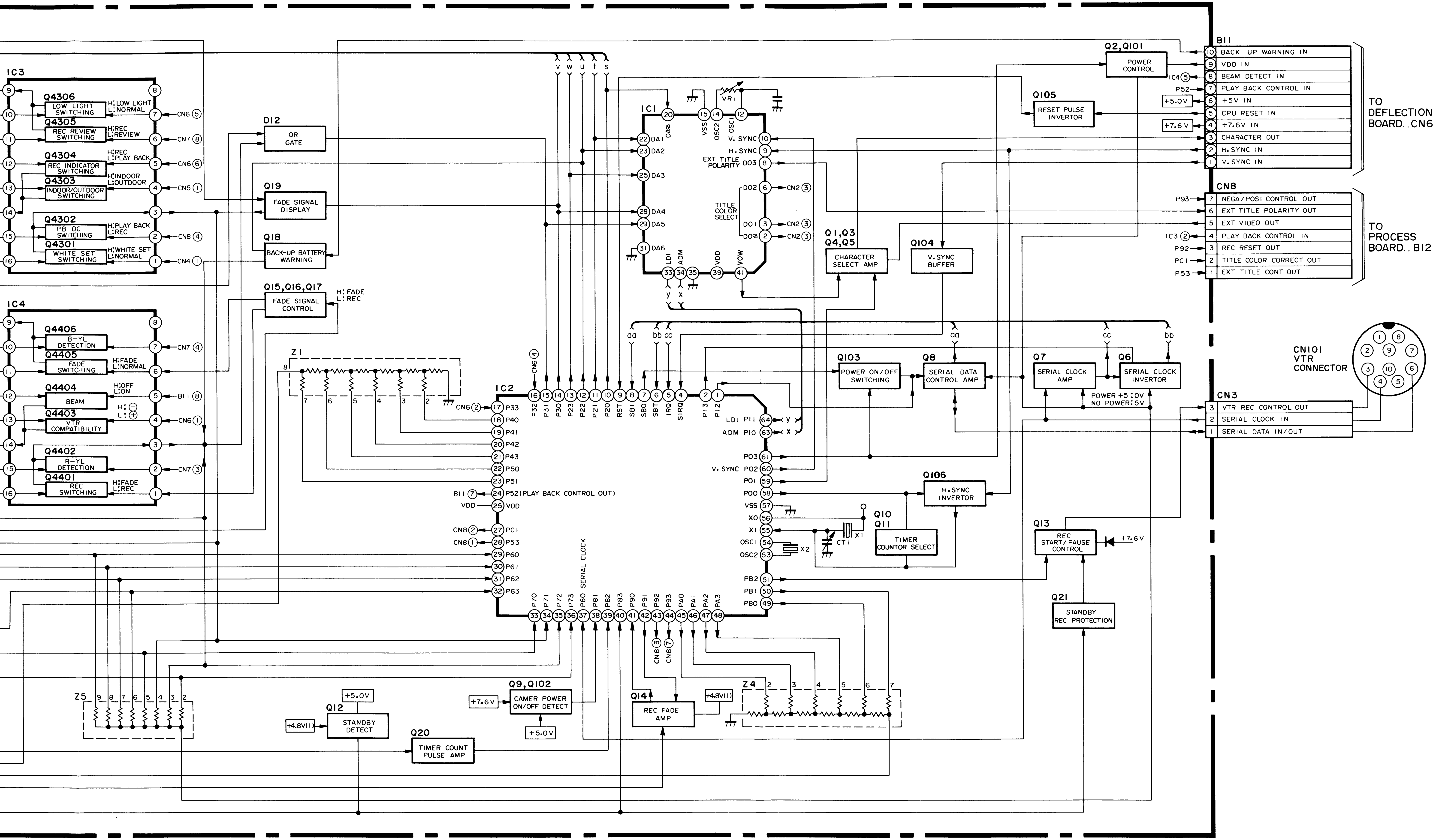
BLOCK DIAGRAM OF AUDIO/LENS CONTROL BOARD (YFVKY3230P5A)


AUDIO/LENS CONTROL BOARD
(YFVKY3230P5A)
B12
ANDBY 1&2:0V)
3:0V)
IN
+7.6V (1)
+7.6V (P.B)
Vs
AUTO IRIS CONTROL AMP
ZOOM CONTROL
+4.8V (1)
TP1
IC1 (a)
AIC AMP
IC1 (b)
AIC AMP
Q2, Q3
ZOOM CONT (WIDE)
Q1, Q4
ZOOM CONT (TELE)
+1.8V
+7.6V(P.B)
CN1
10 Vs OUT
9 AIC DAMPER IN
8 GROUND
7 AIC DRIVE OUT
6 +1.8V OUT
5 GROUND (A/F)
4 ZOOM CONTROL (WIDE) OUT
3 ZOOM CONTROL (TELE) OUT
2 +7.6V OUT (P.B:0V)
1 POWER FOCUS OUT
CN2
IN
ITCH IN
L (WIDE) IN
L (TELE) IN
CN3
L (WIDE) IN
L (TELE) IN
POWER FOCUS
CN107
LENS CONNECTOR
B11
ITCH OUT
+1.8V
IN
CONTROL IN
ANDBY 1&2:0V)
+4.8V(1)
Q8
STANDBY SWITCH
AUDIO AMP CH1(L)
EARPHONE AMP CH1(L)
CN7
3 AUDIO CH1(L) OUT
2 AUDIO CH2(R)/STANDBY OUT
1 AUDIO GROUND
CN5
(L) IN
D
UT
Q5
FADE CONTROL
IC2 (a)
AUDIO CH1(L) AMP
IC3 (a)
EARPHONE CH1(L) AMP
Q6
AUDIO GAIN CONT
EARPHONE AMP CH2(R)
CN101
VTR
CONNECTOR
CN4
UT
(R) IN
D
AUDIO AMP CH2(R)
IC2 (b)
AUDIO CH2(R) AMP
IC3 (b)
EARPHONE CH2(R) AMP
Q7
AUDIO GAIN CONT
CN6
N
D
EARPHONE BOARD
(YFVPKA0712JA)
CN8
3 EARPHONE-CH1(L) OUT
2 EARPHONE-CH2(R) OUT
1 GROUND
EARPHONE
JK1

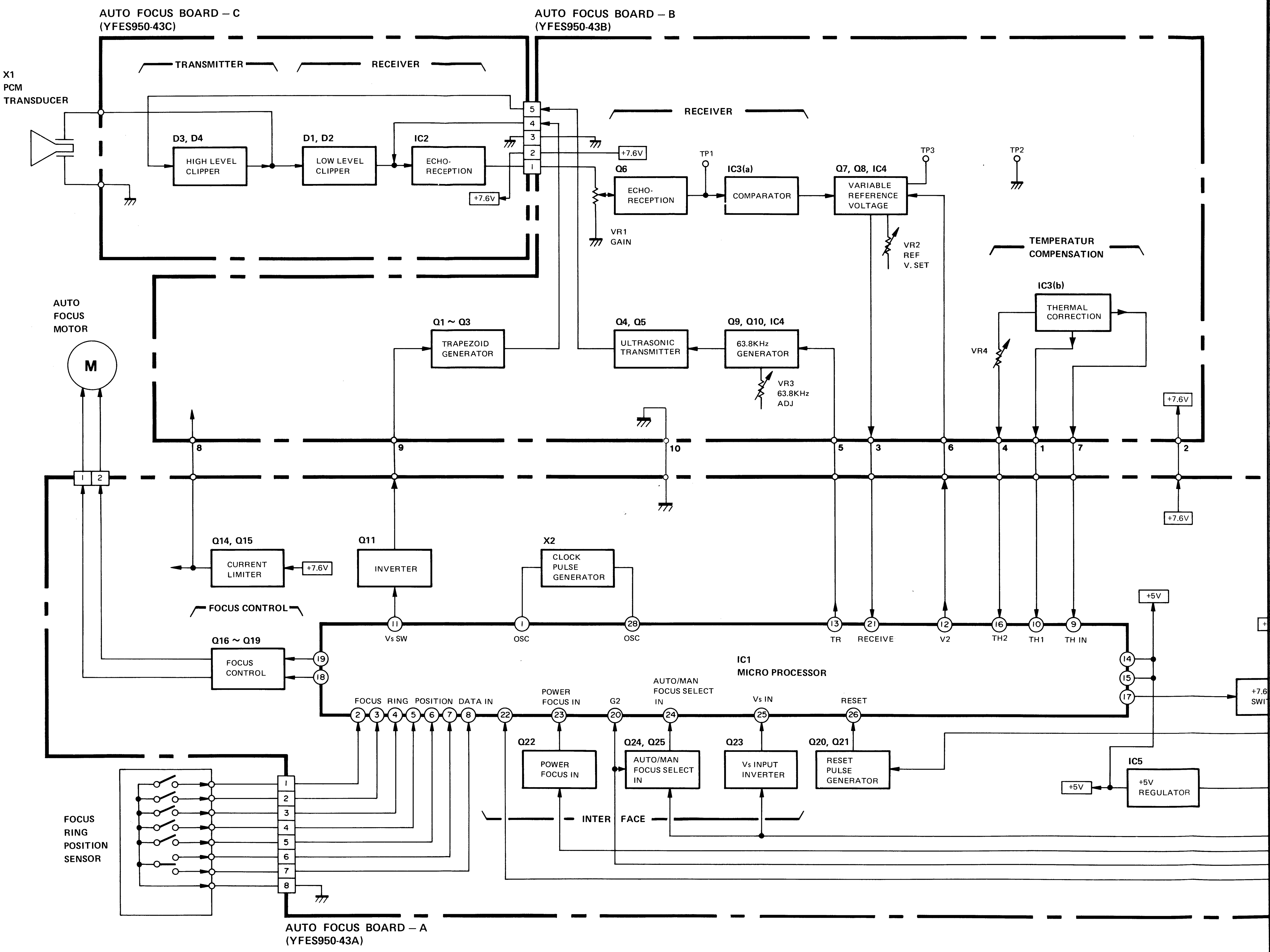
BLOCK DIAGRAM OF MICRO PROCESSOR BOARD (YFVKY3230P4A)


MICRO PROCESSOR BOARD
(YFVKY3230P4A)
WHITE SET SWITCH
SW101 WHITE SET
SW102 INDOOR/OUTDOOR
CN4
WHITE SET SWITCH IN 1
GROUND 2
CN5
INDOOR/OUTDOOR SWITCH IN 1
GROUND 2
IC3 ①
IC3 ④
CN6
VTR COMPATIBILITY SWITCH IN 1 IC4 ④
BATTERY WARNING(2) IN 2 P33
TITLE COLOR SELECT OUT 3 IC1 ②③⑥
BATTERY WARNING (1) IN 4 P32
LOW LIGHT SIGNAL IN 5 IC3 ⑦
FADE SIGNAL IN 6
REC/FADE SWITCH IN 7
REC SIGNAL IN 8 IC3 ⑤
WHITE SET SWITCH OUT 9
TO PROCESS BOARD..B11
SHIFT/RIGHT
WORD SELECT/SEQUENCE
WORD SELECT/REV SEQUENCE
INSERT
SHIFT/LEFT
EXT TITLE
DATE/TIME/SHIFT/WORD L/S
TITLE, PRE
DATE/TIME, PRE/START, START
DATE/TIME, SET, DELETE NEG/POS
TAPE COUNTER DELETE
TAPE COUNTER RESET, TITLE, CLR
TAPE COUNTER MEMORY, KEY
SW8 SW10 SW11 SW12 SW9 SW14 SW4 SW1 SW2 SW3 SW13 SW5 SW6 SW7
CN2
SHIFT/WORD SELE/TAPE COUNT P23 11
RIGHT P70 10
SEQUENCE P72 9
REV SEQ P73 8
INSERT/EXT TITLE/SHIFT P63 7
LEFT P71 6
TITLE/DATE P22 5
NEG/POS/EXT TITLE P21 4
DATE SET/DELETE/NEG/POS P62 3
DATE START/TAPE RESET P61 2
TITLE PRESET/TAPE MEMORY P60 1
LAP/RESET, SLOW
START/STOP
PLAY, NORMAL
FWD, DATE, CHECK
REW, TIME, STOPWATCH, SUBTITLE
TITLE 1,2
SW2 SW1 SW5 SW4 SW6 SW3 SW7 PLAY REC
CN1
STOPWATCH RESET/PLAY P60 8
DATE/STOPWATCH START P61 7
TIME P62 6
STOPWATCH START P21 5
REC/PLAY SELECT P22 4
REC/PLAY SELECT P71 3
TITLE 1,2 P63 2
TITLE 1,2/DATE/NORMAL/TIME P20 1
CN7
+4.8V IN (STANDBY 1&2:0V) 1 +4.8V(1)
+1.8V IN 2 +1.8V
R-YL DETECTION IN 3 IC4 ②
B-YL DETECTION IN 4 IC4 ⑦
V. PULSE FOR TIMER IN 5
BLUE GAIN CONTROL OUT 6
RED GAIN CONTROL OUT 7
REC REVEW SWITCH IN 8 IC3 ⑥
REC/FADE SWITCH IN 9
STANDBY OUT 10
TO PROCESS BOARD..B13
w v u t s
IC3
Q4306 LOW LIGHT SWITCHING H: LOW LIGHT L: NORMAL CN6 ⑤
Q4305 REC REVIEW SWITCHING H: REC L: REVIEW CN7 ⑧
Q4304 REC INDICATOR SWITCHING H: REC L: PLAY BACK CN6 ⑥
Q4303 INDOOR/OUTDOOR SWITCHING H: INDOOR L: OUTDOOR CN5 ①
Q4302 PB DC SWITCHING H: PLAY BACK L: REC CN8 ④
Q4301 WHITE SET SWITCHING H: WHITE SET L: NORMAL CN4 ①
IC4
Q4406 B-YL DETECTION CN7 ④
Q4405 FADE SWITCHING H: FADE L: NORMAL
Q4404 BEAM H: OFF L: ON B11 ⑧
Q4403 VTR COMPATIBILITY H: ⊖ L: ⊕ CN6 ①
Q4402 R-YL DETECTION CN7 ③
Q4401 REC SWITCHING H: FADE L: REC
D12 OR GATE
Q19 FADE SIGNAL DISPLAY
Q18 BACK-UP BATTERY WARNING
Q15, Q16, Q17 FADE SIGNAL CONTROL H: FADE L: REC
Z1
v w u t s
IC1
VR1
DA0 VSS OSC2 OSC1
DA1 DA2 DA3 DA4 DA5 DA6
V. SYNC H. SYNC
EXT TITLE POLARITY D03
D02 CN2 ③
TITLE COLOR SELECT D01 CN2 ③ D00 CN2 ③
LDI ADM VDD VOW
y x
aa bb cc
Q1, Q4, Q
CHA SELE
Q1
PO
IC2
CN6 ④
P32 P31 P30 P23 P22 P21 P20 RST SB1 SB0 SBT IRQ SIRQ P13 P12
CN6 ② P33
P40 P41 P42 P43 P50 P51
B11 ⑦ P52 (PLAY BACK CONTROL OUT)
VDD VDD
CN8 ② PC1
CN8 ① P53
P60 P61 P62 P63
LDI P11 y
ADM P10 x
P03 V. SYNC P02 P01 P00 VSS X0 X1 OSC1 OSC2 PB2 PB1 PB0
X2 CT1
P70 P71 P72 P73 P80 P81 P82 P83 P90 P91 P92 P93 PA0 PA1 PA2 PA3
SERIAL CLOCK
CN8 ③ CN8 ⑦
Z5
Q12 STANDBY DETECT +5.0V +4.8V(1)
Q20 TIMER COUNT PULSE AMP
Q9, Q102 CAMER POWER ON/OFF DETECT +7.6V +5.0V
Q14 REC FADE AMP +4.8V(1)
Z4

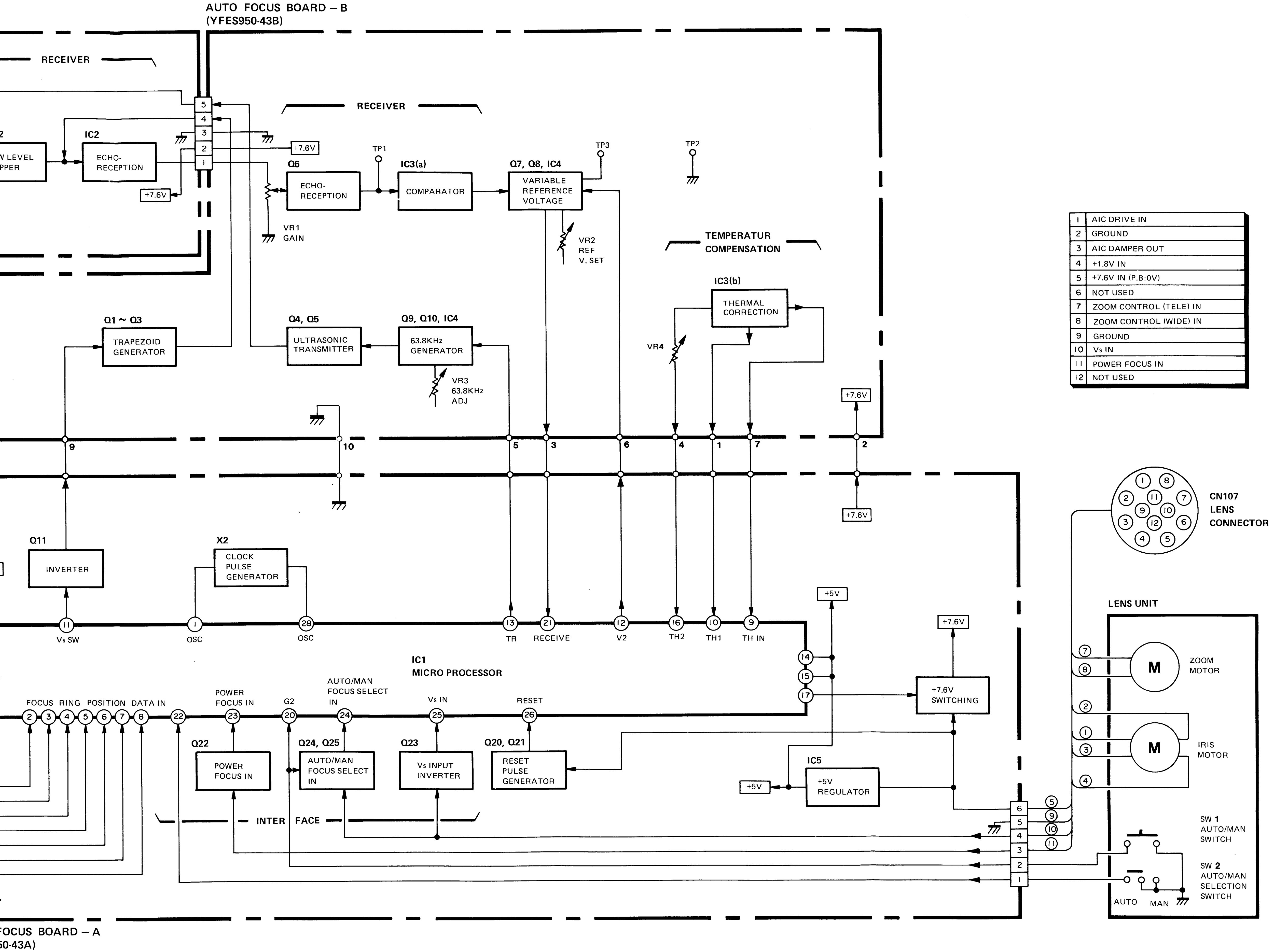
BLOCK DIAGRAM OF MICRO PROCESSOR BOARD (YFVKY3230P4A)


IC3
Q4306 LOW LIGHT SWITCHING
H: LOW LIGHT
L: NORMAL
Q4305 REC REVIEW SWITCHING
H: REC
L: REVIEW
Q4304 REC INDICATOR SWITCHING
H: REC
L: PLAY BACK
Q4303 INDOOR/OUTDOOR SWITCHING
H: INDOOR
L: OUTDOOR
Q4302 PB DC SWITCHING
H: PLAY BACK
L: REC
Q4301 WHITE SET SWITCHING
H: WHITE SET
L: NORMAL
CN6 ⑤
CN7 ⑧
CN6 ⑥
CN5 ①
CN8 ④
CN4 ①
IC4
Q4406 B-YL DETECTION
Q4405 FADE SWITCHING
H: FADE
L: NORMAL
Q4404 BEAM
H: OFF
L: ON
Q4403 VTR COMPATIBILITY
H: ⊖
L: ⊕
Q4402 R-YL DETECTION
Q4401 REC SWITCHING
H: FADE
L: REC
CN7 ④
B11 ⑧
CN6 ①
CN7 ③
D12 OR GATE
Q19 FADE SIGNAL DISPLAY
Q18 BACK-UP BATTERY WARNING
Q15, Q16, Q17 FADE SIGNAL CONTROL
H: FADE
L: REC
Z1
Z5
Z4
v w u t s
IC1
VR1
DAφ DA1 DA2 DA3 DA4 DA5 DA6
VSS OSC2 OSC1
V. SYNC
H. SYNC
EXT TITLE POLARITY DO3
TITLE COLOR SELECT
DO2 DO1 DOφ
CN2 ③
LDI ADM VDD VOW
y x
IC2
CN6 ④
P32 P31 P30 P23 P22 P21 P20 RST SB1 SB0 SBT IRQ SIRQ P13 P12
CN6 ② P33
P40 P41 P42 P43 P50 P51
B11 ⑦ P52 (PLAY BACK CONTROL OUT)
VDD VDD
CN8 ② PC1
CN8 ① P53
P60 P61 P62 P63
P70 P71 P72 P73 P80 SERIAL CLOCK P81 P82 P83 P90 P91 P92 P93 PA0 PA1 PA2 PA3
CN8 ③
CN8 ⑦
LDI P11
ADM P10
P03
V. SYNC P02
P01
P00
VSS
X0
X1
OSC1
OSC2
PB2 PB1 PB0
CT1 X1 X2
Q10 Q11 TIMER COUNTOR SELECT
Q106 H. SYNC INVERTOR
Q9, Q102 CAMER POWER ON/OFF DETECT
+7.6V
+5.0V
Q12 STANDBY DETECT
+4.8V(I)
Q20 TIMER COUNT PULSE AMP
Q14 REC FADE AMP
Q13 REC START/PAUSE CONTROL
Q21 STANDBY REC PROTECTION
Q2, Q101 POWER CONTROL
Q105 RESET PULSE INVERTOR
Q1, Q3 Q4, Q5 CHARACTER SELECT AMP
Q104 V. SYNC BUFFER
Q103 POWER ON/OFF SWITCHING
Q8 SERIAL DATA CONTROL AMP
Q7 SERIAL CLOCK AMP
Q6 SERIAL CLOCK INVERTOR
POWER +5: 0V
NO POWER: 5V
aa bb cc
IC4 ⑤
P52
IC3 ②
P93
P92
PC1
P53
B11
10 BACK-UP WARNING IN
9 VDD IN
8 BEAM DETECT IN
7 PLAY BACK CONTROL IN
6 +5V IN
5 CPU RESET IN
4 +7.6V IN
3 CHARACTER OUT
2 H. SYNC IN
1 V. SYNC IN
TO DEFLECTION BOARD.. CN6
CN8
7 NEGA/POSI CONTROL OUT
6 EXT TITLE POLARITY OUT
5 EXT VIDEO OUT
4 PLAY BACK CONTROL IN
3 REC RESET OUT
2 TITLE COLOR CORRECT OUT
1 EXT TITLE CONT OUT
TO PROCESS BOARD.. B12
CN101 VTR CONNECTOR
CN3
3 VTR REC CONTROL OUT
2 SERIAL CLOCK IN
1 SERIAL DATA IN/OUT

BLOCK DIAGRAM OF AUTO FOCUS LENS BOARD (YFES950-43A, YFES950-43B, YFES950-4

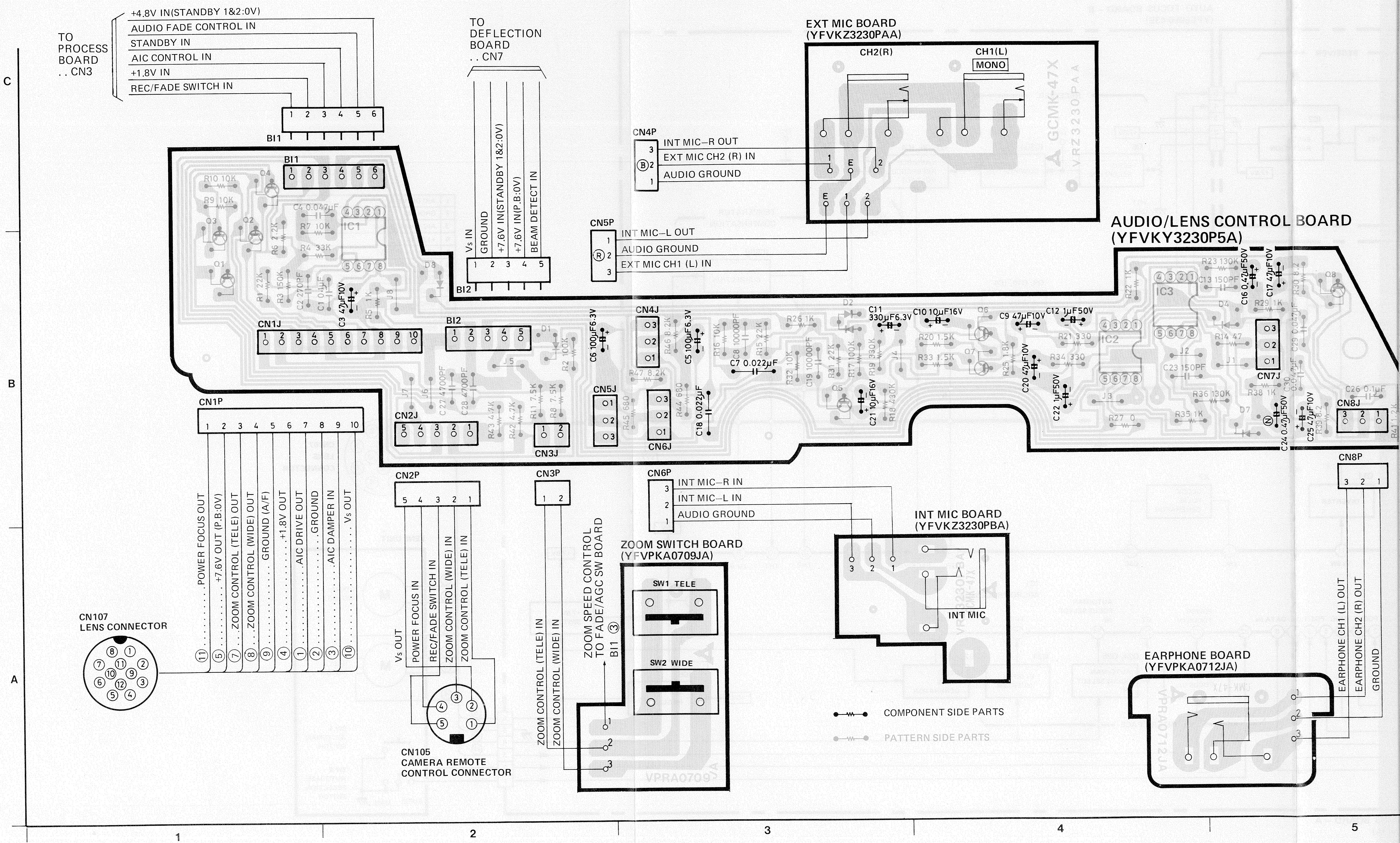

AUTO FOCUS BOARD – C
(YFES950-43C)
AUTO FOCUS BOARD – B
(YFES950-43B)
AUTO FOCUS BOARD – A
(YFES950-43A)
X1
PCM
TRANSDUCER
TRANSMITTER
RECEIVER
D3, D4
HIGH LEVEL
CLIPPER
D1, D2
LOW LEVEL
CLIPPER
IC2
ECHO-
RECEPTION
+7.6V
RECEIVER
TP1
TP3
TP2
Q6
ECHO-
RECEPTION
IC3(a)
COMPARATOR
Q7, Q8, IC4
VARIABLE
REFERENCE
VOLTAGE
VR1
GAIN
VR2
REF
V. SET
TEMPERATUR
COMPENSATION
IC3(b)
THERMAL
CORRECTION
VR4
AUTO
FOCUS
MOTOR
M
Q1 ~ Q3
TRAPEZOID
GENERATOR
Q4, Q5
ULTRASONIC
TRANSMITTER
Q9, Q10, IC4
63.8KHz
GENERATOR
VR3
63.8KHz
ADJ
+7.6V
8
9
10
5
3
6
4
1
7
2
+7.6V
Q14, Q15
CURRENT
LIMITER
+7.6V
Q11
INVERTER
X2
CLOCK
PULSE
GENERATOR
+5V
FOCUS CONTROL
Q16 ~ Q19
FOCUS
CONTROL
Vs SW
OSC
OSC
TR
RECEIVE
V2
TH2
TH1
TH IN
IC1
MICRO PROCESSOR
FOCUS RING POSITION DATA IN
POWER
FOCUS IN
G2
AUTO/MAN
FOCUS SELECT
IN
Vs IN
RESET
+7.6
SWI
Q22
POWER
FOCUS IN
Q24, Q25
AUTO/MAN
FOCUS SELECT
IN
Q23
Vs INPUT
INVERTER
Q20, Q21
RESET
PULSE
GENERATOR
IC5
+5V
REGULATOR
+5V
INTER FACE
FOCUS
RING
POSITION
SENSOR

CK DIAGRAM OF AUTO FOCUS LENS BOARD (YFES950-43A, YFES950-43B, YFES950-43C)

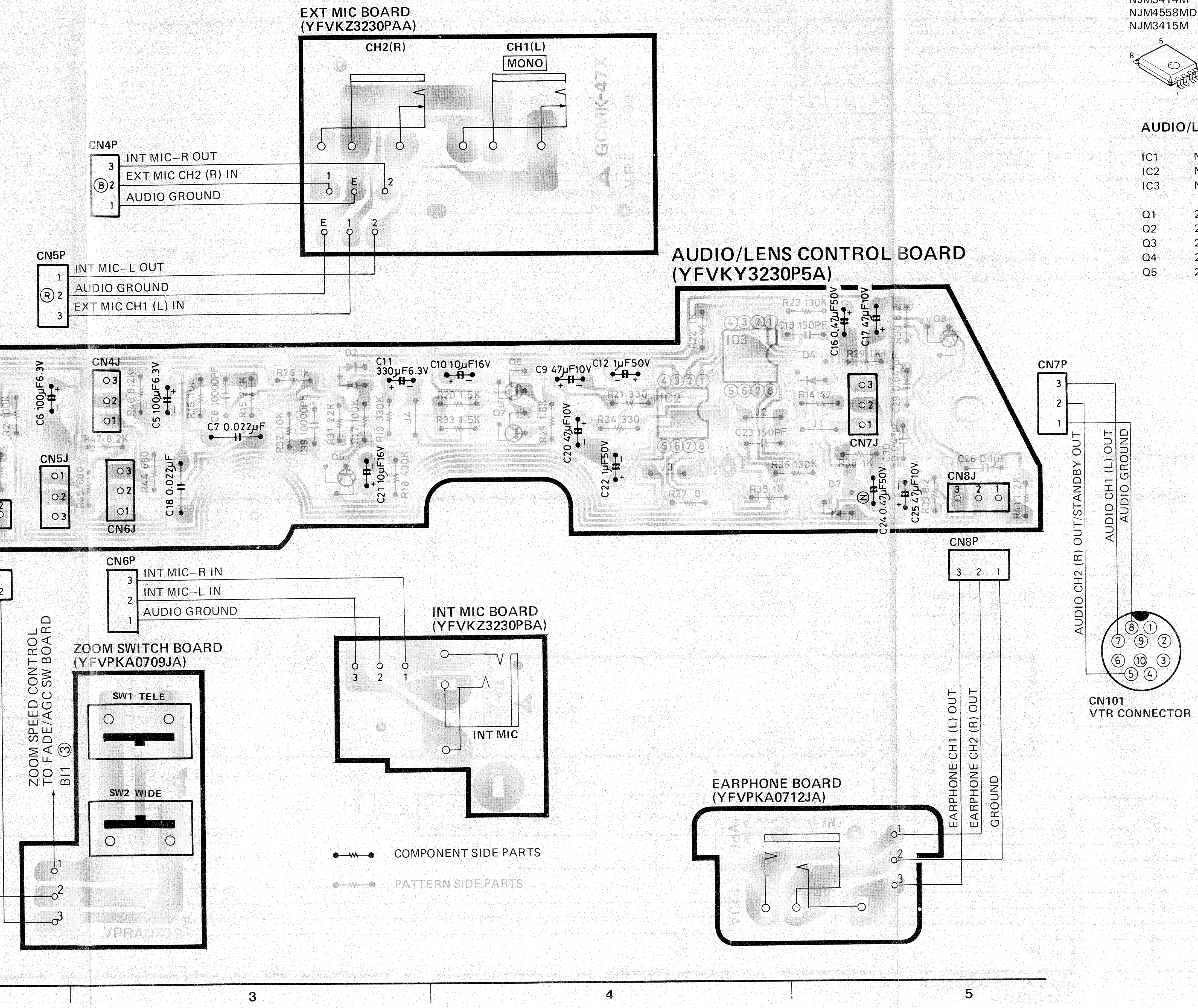

AUTO FOCUS BOARD – B
(YFES950-43B)
RECEIVER
2
W LEVEL
PPER
IC2
ECHO-
RECEPTION
+7.6V
5
4
3
2
1
RECEIVER
+7.6V
Q6
ECHO-
RECEPTION
TP1
IC3(a)
COMPARATOR
TP3
Q7, Q8, IC4
VARIABLE
REFERENCE
VOLTAGE
TP2
VR1
GAIN
VR2
REF
V. SET
TEMPERATUR
COMPENSATION
IC3(b)
THERMAL
CORRECTION
VR4
Q1 ~ Q3
TRAPEZOID
GENERATOR
Q4, Q5
ULTRASONIC
TRANSMITTER
Q9, Q10, IC4
63.8KHz
GENERATOR
VR3
63.8KHz
ADJ
+7.6V
9
10
5
3
6
4
1
7
2
+7.6V
Q11
INVERTER
X2
CLOCK
PULSE
GENERATOR
11
Vs SW
1
OSC
28
OSC
13
TR
21
RECEIVE
12
V2
16
TH2
10
TH1
9
TH IN
+5V
+7.6V
14
15
17
IC1
MICRO PROCESSOR
+7.6V
SWITCHING
FOCUS RING POSITION DATA IN
2 3 4 5 6 7 8
22
POWER
FOCUS IN
23
G2
20
AUTO/MAN
FOCUS SELECT
IN
24
Vs IN
25
RESET
26
Q22
POWER
FOCUS IN
Q24, Q25
AUTO/MAN
FOCUS SELECT
IN
Q23
Vs INPUT
INVERTER
Q20, Q21
RESET
PULSE
GENERATOR
IC5
+5V
REGULATOR
+5V
INTER FACE
6
5
4
3
2
1
5
9
10
11
FOCUS BOARD – A
50-43A)
CN107
LENS
CONNECTOR
1 2 3 4 5 6 7 8 9 10 11 12
LENS UNIT
7
8
M
ZOOM
MOTOR
2
1
3
4
M
IRIS
MOTOR
SW 1
AUTO/MAN
SWITCH
SW 2
AUTO/MAN
SELECTION
SWITCH
AUTO
MAN

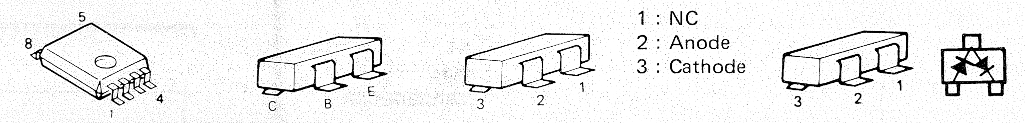
1	AIC DRIVE IN
2	GROUND
3	AIC DAMPER OUT
4	+1.8V IN
5	+7.6V IN (P.B:0V)
6	NOT USED
7	ZOOM CONTROL (TELE) IN
8	ZOOM CONTROL (WIDE) IN
9	GROUND
10	Vs IN
11	POWER FOCUS IN
12	NOT USED

CONDUCTOR VIEW OF AUDIO/LENS CONTROL BOARD (YFVKY3230P5A)


TO PROCESS BOARD ..CN3
+4.8V IN(STANDBY 1&2:0V)
AUDIO FADE CONTROL IN
STANDBY IN
AIC CONTROL IN
+1.8V IN
REC/FADE SWITCH IN
BI1
TO DEFLECTION BOARD ..CN7
Vs IN
GROUND
+7.6V IN(STANDBY 1&2:0V)
+7.6V IN(P.B:0V)
BEAM DETECT IN
BI2
EXT MIC BOARD (YFVKZ3230PAA)
CH2(R)
CH1(L)
MONO
GCMK-47X
VRZ3230PAA
CN4P
INT MIC-R OUT
EXT MIC CH2 (R) IN
AUDIO GROUND
CN5P
INT MIC-L OUT
AUDIO GROUND
EXT MIC CH1 (L) IN
AUDIO/LENS CONTROL BOARD (YFVKY3230P5A)
IC1
IC2
IC3
CN1J
CN2J
CN3J
CN4J
CN5J
CN6J
CN7J
CN8J
CN1P
POWER FOCUS OUT
+7.6V OUT (P.B:0V)
ZOOM CONTROL (TELE) OUT
ZOOM CONTROL (WIDE) OUT
GROUND (A/F)
+1.8V OUT
AIC DRIVE OUT
GROUND
AIC DAMPER IN
Vs OUT
CN107 LENS CONNECTOR
CN2P
Vs OUT
POWER FOCUS IN
REC/FADE SWITCH IN
ZOOM CONTROL (WIDE) IN
ZOOM CONTROL (TELE) IN
CN105 CAMERA REMOTE CONTROL CONNECTOR
CN3P
ZOOM CONTROL (TELE) IN
ZOOM CONTROL (WIDE) IN
ZOOM SPEED CONTROL TO FADE/AGC SW BOARD BI1 ③
ZOOM SWITCH BOARD (YFVPKA0709JA)
SW1 TELE
SW2 WIDE
VPRA0709JA
CN6P
INT MIC-R IN
INT MIC-L IN
AUDIO GROUND
INT MIC BOARD (YFVKZ3230PBA)
INT MIC
CN8P
EARPHONE CH1 (L) OUT
EARPHONE CH2 (R) OUT
GROUND
EARPHONE BOARD (YFVPKA0712JA)
VPRA0712JA
COMPONENT SIDE PARTS
PATTERN SIDE PARTS
C
B
A
1
2
3
4
5

CONDUCTOR VIEW OF AUDIO/LENS CONTROL BOARD (YFVKY3230P5A)

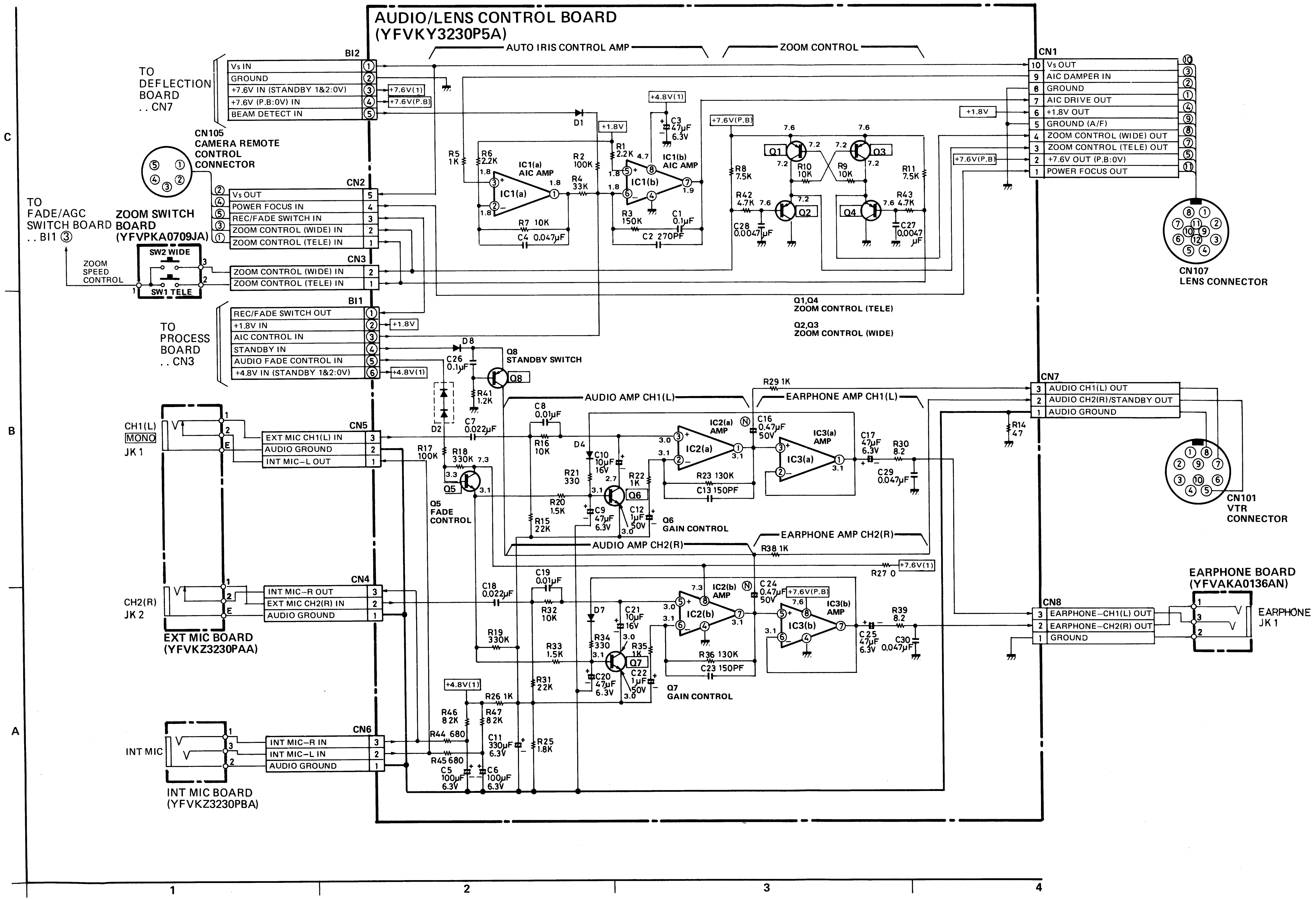

EXT MIC BOARD
(YFVKZ3230PAA)
CH2(R)
CH1(L)
MONO
GCMK-47X
VRZ3230PAA
E 1 2
CN4P
INT MIC–R OUT
EXT MIC CH2 (R) IN
AUDIO GROUND
CN5P
INT MIC–L OUT
AUDIO GROUND
EXT MIC CH1 (L) IN
AUDIO/LENS CONTROL BOARD
(YFVKY3230P5A)
IC1
IC2
IC3
Q1
Q5
Q6
Q7
Q8
D2
D4
D7
C5 100μF6.3V
C6 100μF6.3V
C7 0.022μF
C8 1000PF
C9 47μF10V
C10 10μF16V
C11 330μF6.3V
C12 1μF50V
C13 150PF
C16 0.47μF50V
C17 47μF10V
C18 0.022μF
C19 10000PF
C20 47μF10V
C21 10μF16V
C22 1μF50V
C23 150PF
C24 0.47μF50V
C25 47μF10V
C26 0.1μF
C29 0.047μF
C30 0.047μF
R2 100K
R14 47
R15 2.2K
R16 10K
R17 100K
R18 430K
R19 330K
R20 1.5K
R21 330
R22 1K
R23 130K
R25 1.8K
R26 1K
R27 0
R29 1K
R30 8.2
R31 22K
R32 10K
R33 1.5K
R34 330
R35 1K
R36 130K
R38 1K
R39 8.2
R41 1.2K
R44 680
R45 680
R46 8.2K
R47 8.2K
J1
J2
J3
J4
CN4J
CN5J
CN6J
CN7J
CN8J
CN7P
AUDIO CH2 (R) OUT/STANDBY OUT
AUDIO CH1 (L) OUT
AUDIO GROUND
CN101
VTR CONNECTOR
CN8P
EARPHONE CH1 (L) OUT
EARPHONE CH2 (R) OUT
GROUND
EARPHONE BOARD
(YFVPKA0712JA)
VPRA0712JA
CN6P
INT MIC–R IN
INT MIC–L IN
AUDIO GROUND
INT MIC BOARD
(YFVKZ3230PBA)
INT MIC
ZOOM SWITCH BOARD
(YFVPKA0709JA)
SW1 TELE
SW2 WIDE
VPRA0709JA
ZOOM SPEED CONTROL
TO FADE/AGC SW BOARD
BI1 ③
COMPONENT SIDE PARTS
PATTERN SIDE PARTS
3
4
5


NJM3414M
NJM4558MD
NJM3415M
2SC2405-STU
2SB709-QRS
MA151K
MA153
1 : NC
2 : Anode
3 : Cathode
C B E
3 2 1

AUDIO/LENS CONTROL BOARD

IC1	NJM3414M		B2	Q6	2SC2405STU	[S]	B4
IC2	NJM4558MD		B4	Q7	2SC2405STU	[S]	B4
IC3	NJM3415M		B4	Q8	2SB709-QRS	[A]	B5
Q1	2SB709-QRS	[A]	B1	D1	MA151K	[MH]	B2
Q2	2SB709-QRS	[A]	B1	D2	MA153	[MC]	B3
Q3	2SB709-QRS	[A]	B1	D4	MA151K	[MH]	B5
Q4	2SB709-QRS	[A]	C1	D7	MA151K	[MH]	B5
Q5	2SC2405ST	[S]	B3	D8	MA151K	[MH]	B2

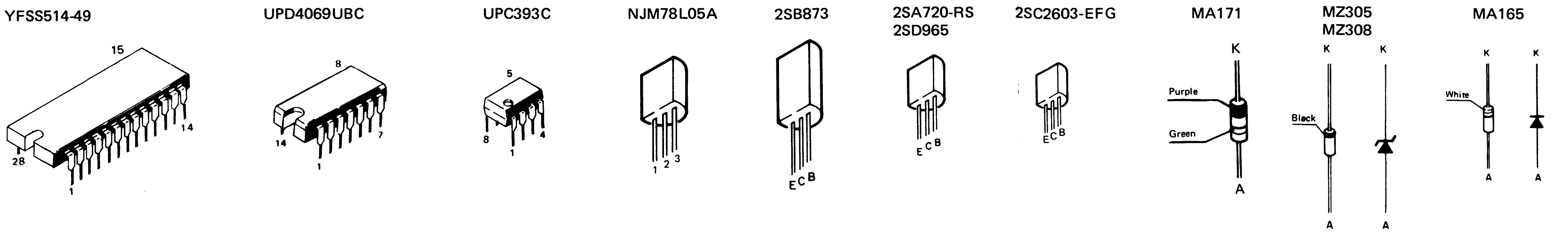
SCHEMATIC DIAGRAM OF AUDIO/LENS CONTROL BOARD (YFVKY3230P5A)

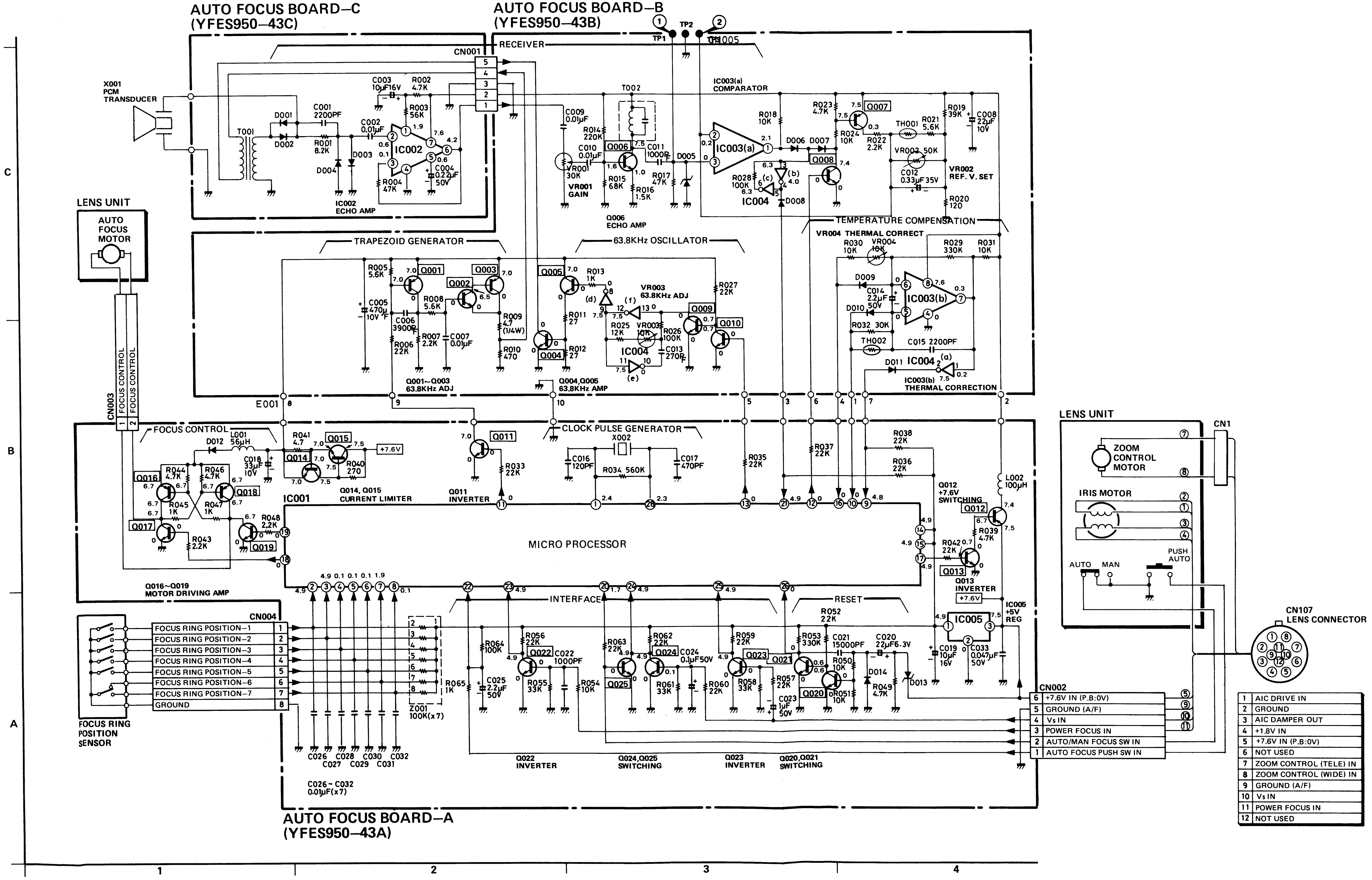

AUDIO/LENS CONTROL BOARD (YFVKY3230P5A)
AUTO IRIS CONTROL AMP
ZOOM CONTROL
BI2
Vs IN
GROUND
+7.6V IN (STANDBY 1&2:0V)
+7.6V (P.B:0V) IN
BEAM DETECT IN
TO DEFLECTION BOARD ..CN7
CN105 CAMERA REMOTE CONTROL CONNECTOR
CN2
Vs OUT
POWER FOCUS IN
REC/FADE SWITCH IN
ZOOM CONTROL (WIDE) IN
ZOOM CONTROL (TELE) IN
TO FADE/AGC SWITCH BOARD ..BI1 ③
ZOOM SWITCH BOARD (YFVPKA0709JA)
SW2 WIDE
SW1 TELE
ZOOM SPEED CONTROL
CN3
BI1
REC/FADE SWITCH OUT
+1.8V IN
AIC CONTROL IN
STANDBY IN
AUDIO FADE CONTROL IN
+4.8V IN (STANDBY 1&2:0V)
TO PROCESS BOARD ..CN3
IC1(a) AIC AMP
IC1(b) AIC AMP
Q1,Q4 ZOOM CONTROL (TELE)
Q2,Q3 ZOOM CONTROL (WIDE)
CN1
Vs OUT
AIC DAMPER IN
GROUND
AIC DRIVE OUT
+1.8V OUT
GROUND (A/F)
ZOOM CONTROL (WIDE) OUT
ZOOM CONTROL (TELE) OUT
+7.6V OUT (P.B:0V)
POWER FOCUS OUT
CN107 LENS CONNECTOR
Q8 STANDBY SWITCH
AUDIO AMP CH1(L)
EARPHONE AMP CH1(L)
IC2(a) AMP
IC3(a) AMP
CN7
AUDIO CH1(L) OUT
AUDIO CH2(R)/STANDBY OUT
AUDIO GROUND
CN101 VTR CONNECTOR
CH1(L) MONO JK1
CN5
EXT MIC CH1(L) IN
AUDIO GROUND
INT MIC-L OUT
Q5 FADE CONTROL
Q6 GAIN CONTROL
AUDIO AMP CH2(R)
EARPHONE AMP CH2(R)
CH2(R) JK2
CN4
INT MIC-R OUT
EXT MIC CH2(R) IN
AUDIO GROUND
EXT MIC BOARD (YFVKZ3230PAA)
IC2(b) AMP
IC3(b) AMP
Q7 GAIN CONTROL
EARPHONE BOARD (YFVAKA0136AN)
CN8
EARPHONE-CH1(L) OUT
EARPHONE-CH2(R) OUT
GROUND
EARPHONE JK1
INT MIC
CN6
INT MIC-R IN
INT MIC-L IN
AUDIO GROUND
INT MIC BOARD (YFVKZ3230PBA)
A
B
C
1
2
3
4

AUDIO/LENS CONTROL BOARD

IC1	NJM3414M		C2,C3
IC2	NJM4558MD		A3,B3
IC3	NJM3415M		A3,B3
Q1	2SB709-QRS	[A]	C3
Q2	2SB709-QRS	[A]	C3
Q3	2SB709-QRS	[A]	C3
Q4	2SB709-QRS	[A]	C3
Q5	2SC2405ST	[S]	B2
Q6	2SC2405STU	[S]	B3
Q7	2SC2405STU	[S]	A3
Q8	2SB709-QRS	[A]	B2
D1	MA151K	[MH]	C2
D2	MA153	[MC]	B2
D4	MA151K	[MH]	B2
D7	MA151K	[MH]	A2
D8	MA151K	[MH]	B2

SCHEMATIC DIAGRAM OF AUTO FOCUS LENS BOARD


YFSS514-49
UPD4069UBC
UPC393C
NJM78L05A
2SB873
2SA720-RS
2SD965
2SC2603-EFG
MA171
MZ305
MZ308
MA165
Purple
Green
Black
White
K
A
E C B

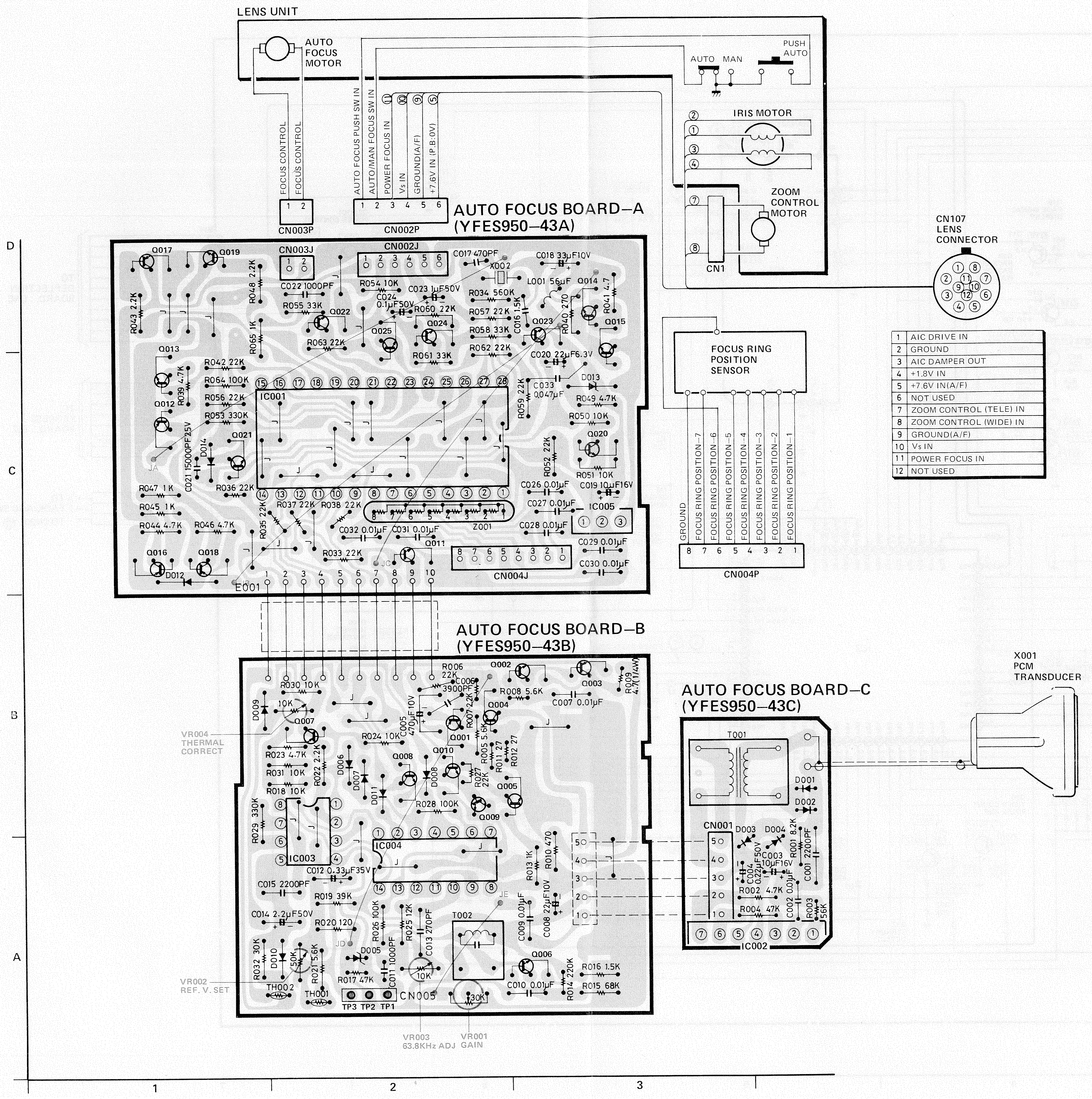

AUTO FOCUS BOARD–C
(YFES950–43C)
AUTO FOCUS BOARD–B
(YFES950–43B)
AUTO FOCUS BOARD–A
(YFES950–43A)
X001 PCM TRANSDUCER
RECEIVER
CN001
IC002 ECHO AMP
IC003(a) COMPARATOR
Q006 ECHO AMP
VR001 GAIN
VR002 REF. V. SET
TEMPERATURE COMPENSATION
VR004 THERMAL CORRECT
IC003(b) THERMAL CORRECTION
TRAPEZOID GENERATOR
63.8KHz OSCILLATOR
VR003 63.8KHz ADJ
Q001~Q003 63.8KHz ADJ
Q004,Q005 63.8KHz AMP
LENS UNIT
AUTO FOCUS MOTOR
CN003
FOCUS CONTROL
FOCUS CONTROL
FOCUS CONTROL
Q014, Q015 CURRENT LIMITER
Q011 INVERTER
CLOCK PULSE GENERATOR
IC001
MICRO PROCESSOR
Q016~Q019 MOTOR DRIVING AMP
Q012 +7.6V SWITCHING
Q013 INVERTER
IC005 +5V REG
INTERFACE
RESET
CN004
FOCUS RING POSITION–1
FOCUS RING POSITION–2
FOCUS RING POSITION–3
FOCUS RING POSITION–4
FOCUS RING POSITION–5
FOCUS RING POSITION–6
FOCUS RING POSITION–7
GROUND
FOCUS RING POSITION SENSOR
Z001 100K(x7)
C026~C032 0.01μF(x7)
Q022 INVERTER
Q024,Q025 SWITCHING
Q023 INVERTER
Q020,Q021 SWITCHING
CN002
6 +7.6V IN (P.B:0V)
5 GROUND (A/F)
4 Vs IN
3 POWER FOCUS IN
2 AUTO/MAN FOCUS SW IN
1 AUTO FOCUS PUSH SW IN
LENS UNIT
CN1
ZOOM CONTROL MOTOR
IRIS MOTOR
AUTO
MAN
PUSH AUTO
CN107 LENS CONNECTOR
TP1
TP2
C
B
A
1
2
3
4

1	AIC DRIVE IN
2	GROUND
3	AIC DAMPER OUT
4	+1.8V IN
5	+7.6V IN (P.B:0V)
6	NOT USED
7	ZOOM CONTROL (TELE) IN
8	ZOOM CONTROL (WIDE) IN
9	GROUND (A/F)
10	Vs IN
11	POWER FOCUS IN
12	NOT USED

AUTO FOCUS LENS BOARD

IC001	YFSS514-77	B2,B3
IC002	TA7120P	C2
IC003	UPC393C	C3,C4
IC004	UPD4069UBC	B3,C3
IC005	NJM78L05A	A4
Q001	2SA1115	C2
Q002	2SC2603	C2
Q003	2SB873	C2
Q004	2SD965	B2
Q005	2SC1317	B2
Q006	2SC2603	C3
Q007	2SA1115	C4
Q008	2SC2603	C3
Q009	2SC2603	B3
Q010	2SC2603	B3
Q011	2SC2603	B2
Q012	2SA1115	B4
Q013	2SC2603	B4
Q014	2SC2603	B2
Q015	2SD965	B2
Q016	2SA720	B1
Q017	2SD965	B1
Q018	2SA720	B1
Q019	2SD965	B1
Q020	2SC2603	A3
Q021	2SC2603	A3
Q022	2SC2603	A2
Q023	2SC2603	A3
Q024	2SC2603	A3
Q025	2SC2603	A3
D001	MA171	C1
D002	MA171	C2
D003	MA171	C2
D004	MA171	C2
D005	MZ308	C3
D006	MA165	C3
D007	MA165	C3
D008	MA165	C3
D009	MA165	C4
D010	MA165	C4
D011	MA165	B4
D012	1N4002	B1
D013	MZ305	A4
D014	MA165	A4

CONDUCTOR VIEW OF AUTO FOCUS LENS BOARD

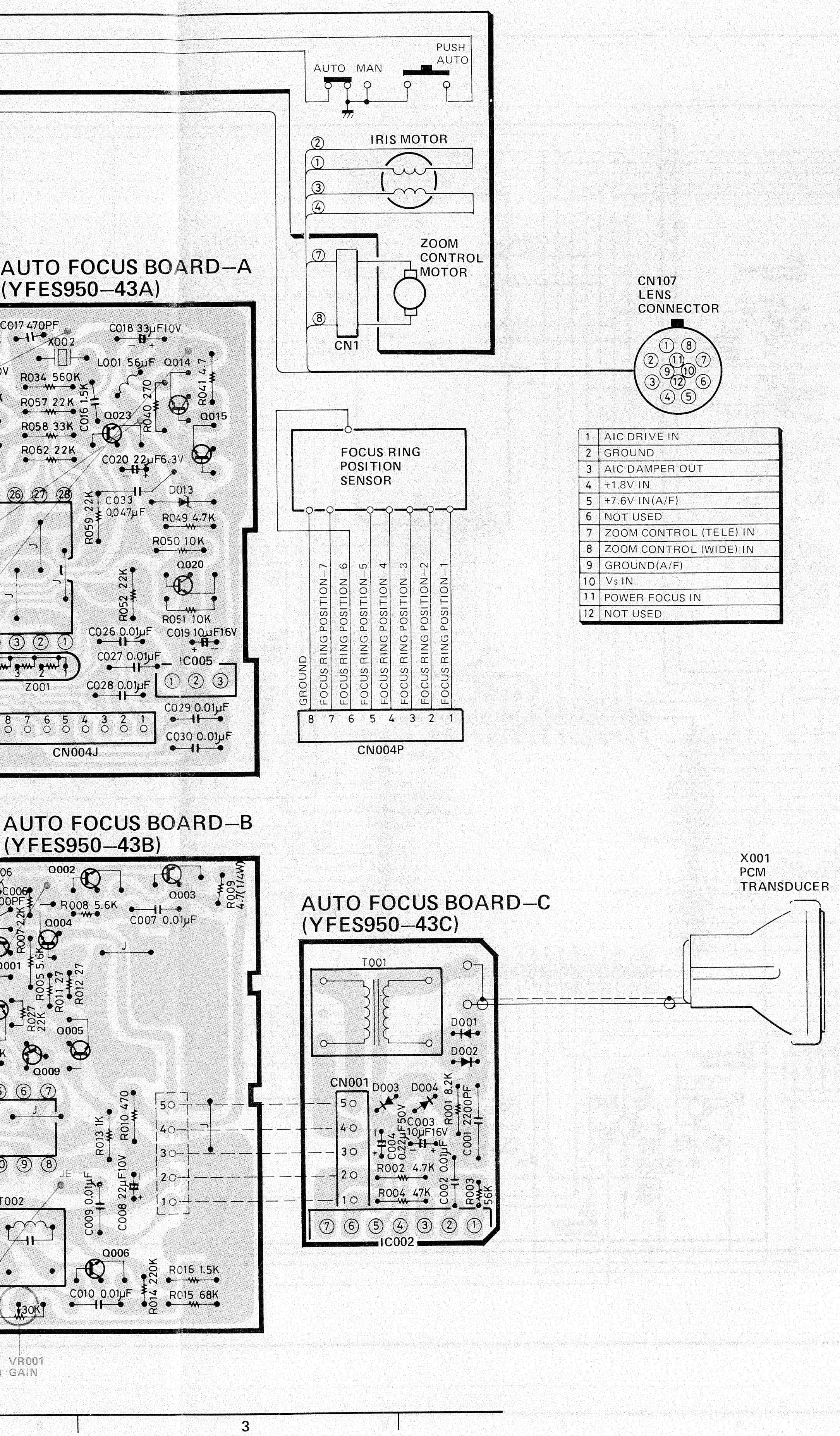

LENS UNIT
AUTO FOCUS MOTOR
PUSH AUTO
AUTO MAN
IRIS MOTOR
ZOOM CONTROL MOTOR
CN1
CN107 LENS CONNECTOR
FOCUS CONTROL
FOCUS CONTROL
AUTO FOCUS PUSH SW IN
AUTO/MAN FOCUS SW IN
POWER FOCUS IN
Vs IN
GROUND(A/F)
+7.6V IN (P.B:0V)
CN003P
CN002P
AUTO FOCUS BOARD–A
(YFES950–43A)
CN003J
CN002J
IC001
IC005
Z001
CN004J
E001
FOCUS RING POSITION SENSOR
GROUND
FOCUS RING POSITION–7
FOCUS RING POSITION–6
FOCUS RING POSITION–5
FOCUS RING POSITION–4
FOCUS RING POSITION–3
FOCUS RING POSITION–2
FOCUS RING POSITION–1
CN004P
AUTO FOCUS BOARD–B
(YFES950–43B)
IC003
IC004
T002
CN005
TP3 TP2 TP1
VR004 THERMAL CORRECT
VR002 REF. V. SET
VR003 63.8KHz ADJ
VR001 GAIN
TH001
TH002
AUTO FOCUS BOARD–C
(YFES950–43C)
T001
CN001
IC002
X001 PCM TRANSDUCER
D
C
B
A
1
2
3

1	AIC DRIVE IN
2	GROUND
3	AIC DAMPER OUT
4	+1.8V IN
5	+7.6V IN(A/F)
6	NOT USED
7	ZOOM CONTROL (TELE) IN
8	ZOOM CONTROL (WIDE) IN
9	GROUND(A/F)
10	Vs IN
11	POWER FOCUS IN
12	NOT USED

AUTO FOCUS LENS BOARD

IC001	YFSS514-77	C2
IC002	TA7120P	A3
IC003	UPC393C	A2
IC004	UPD4069UBC	A2
IC005	NJM78L05A	C3
Q001	2SA1115	B2
Q002	2SC2603	B2
Q003	2SB873	B3
Q004	2SD965	B2
Q005	2SC1317	B2
Q006	2SC2603	A3
Q007	2SA1115	B2
Q008	2SC2603	B2
Q009	2SC2603	B2
Q010	2SC2603	B2
Q011	2SC2603	C2
Q012	2SA1115	C1
Q013	2SC2603	C1
Q014	2SC2603	D3
Q015	2SD965	D3
Q016	2SA720	C1
Q017	2SD965	D1
Q018	2SA720	C1
Q019	2SD965	D1
Q020	2SC2603	C3
Q021	2SC2603	C1
Q022	2SC2603	D2
Q023	2SC2603	D3
Q024	2SC2603	D2
Q025	2SC2603	D2
D001	MA171	B4
D002	MA171	B4
D003	MA171	A3
D004	MA171	A4
D005	MZ308	A2
D006	MA165	B2
D007	MA165	B2
D008	MA165	B2
D009	MA165	B1
D010	MA165	A2
D011	MA165	B2
D012	1N4002	C1
D013	MZ305	C3
D014	MA165	C1

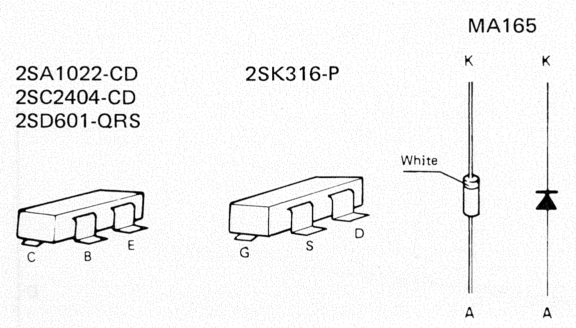
OF AUTO FOCUS LENS BOARD


AUTO
MAN
PUSH AUTO
IRIS MOTOR
ZOOM CONTROL MOTOR
CN1
CN107 LENS CONNECTOR
AUTO FOCUS BOARD–A (YFES950–43A)
FOCUS RING POSITION SENSOR
GROUND
FOCUS RING POSITION–7
FOCUS RING POSITION–6
FOCUS RING POSITION–5
FOCUS RING POSITION–4
FOCUS RING POSITION–3
FOCUS RING POSITION–2
FOCUS RING POSITION–1
CN004J
CN004P
AUTO FOCUS BOARD–B (YFES950–43B)
AUTO FOCUS BOARD–C (YFES950–43C)
T001
CN001
IC002
X001 PCM TRANSDUCER
VR001
GAIN
3

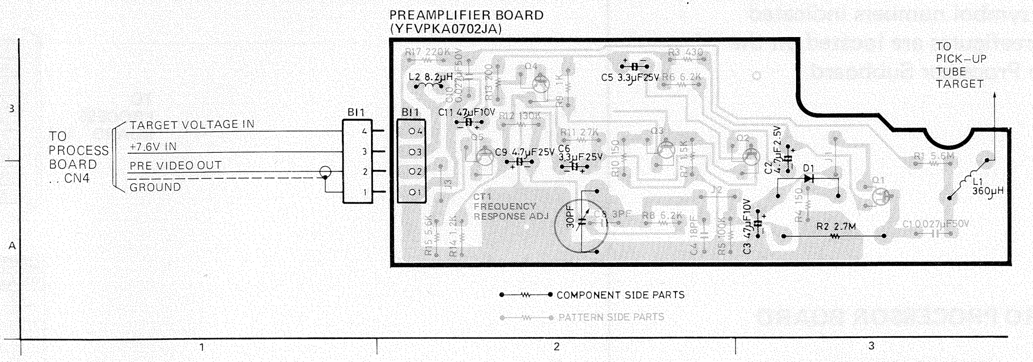
1	AIC DRIVE IN
2	GROUND
3	AIC DAMPER OUT
4	+1.8V IN
5	+7.6V IN(A/F)
6	NOT USED
7	ZOOM CONTROL (TELE) IN
8	ZOOM CONTROL (WIDE) IN
9	GROUND(A/F)
10	Vs IN
11	POWER FOCUS IN
12	NOT USED

AUTO FOCUS LENS BOARD

IC001	YFSS514-77	C2
IC002	TA7120P	A3
IC003	UPC393C	A2
IC004	UPD4069UBC	A2
IC005	NJM78L05A	C3
Q001	2SA1115	B2
Q002	2SC2603	B2
Q003	2SB873	B3
Q004	2SD965	B2
Q005	2SC1317	B2
Q006	2SC2603	A3
Q007	2SA1115	B2
Q008	2SC2603	B2
Q009	2SC2603	B2
Q010	2SC2603	B2
Q011	2SC2603	C2
Q012	2SA1115	C1
Q013	2SC2603	C1
Q014	2SC2603	D3
Q015	2SD965	D3
Q016	2SA720	C1
Q017	2SD965	D1
Q018	2SA720	C1
Q019	2SD965	D1
Q020	2SC2603	C3
Q021	2SC2603	C1
Q022	2SC2603	D2
Q023	2SC2603	D3
Q024	2SC2603	D2
Q025	2SC2603	D2
D001	MA171	B4
D002	MA171	B4
D003	MA171	A3
D004	MA171	A4
D005	MZ308	A2
D006	MA165	B2
D007	MA165	B2
D008	MA165	B2
D009	MA165	B1
D010	MA165	A2
D011	MA165	B2
D012	1N4002	C1
D013	MZ305	C3
D014	MA165	C1


MA165
2SA1022-CD
2SC2404-CD
2SD601-QRS
2SK316-P
C
B
E
G
S
D
White
K
K
A
A

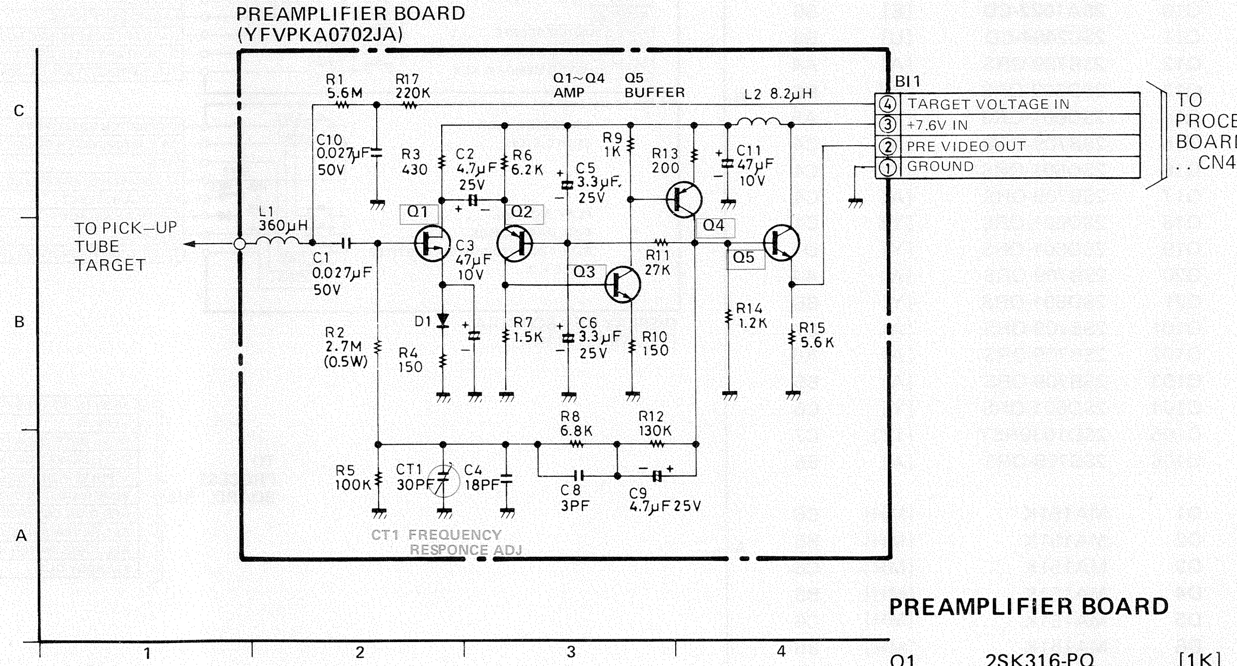
CONDUCTOR VIEW OF PREAMPLIFIER BOARD


PREAMPLIFIER BOARD
(YFVPKA0702JA)
TO PROCESS BOARD ..CN4
TARGET VOLTAGE IN
+7.6V IN
PRE VIDEO OUT
GROUND
BI1
TO PICK–UP TUBE TARGET
CT1 FREQUENCY RESPONSE ADJ
COMPONENT SIDE PARTS
PATTERN SIDE PARTS
1
2
3
A

PREAMPLIFIER BOARD

Q1	2SK316-PQ	[1K]	A3
Q2	2SA1022-CD	[E]	B3
Q3	2SC2404-CD	[U]	B2
Q4	2SA1022-CD	[E]	B2
Q5	2SD601-QRS	[Y]	B5
D1	MA165		A3

SCHEMATIC DIAGRAM OF PREAMPLIFIER BOARD


PREAMPLIFIER BOARD
(YFVPKA0702JA)
R1 5.6M
R17 220K
Q1~Q4 AMP
Q5 BUFFER
L2 8.2μH
BI1
④ TARGET VOLTAGE IN
③ +7.6V IN
② PRE VIDEO OUT
① GROUND
TO PROCESS BOARD ..CN4
C10 0.027μF 50V
R3 430
C2 4.7μF 25V
R6 6.2K
C5 3.3μF 25V
R9 1K
R13 200
C11 47μF 10V
TO PICK–UP TUBE TARGET
L1 360μH
C1 0.027μF 50V
Q1
Q2
C3 47μF 10V
Q3
R11 27K
Q4
Q5
D1
R7 1.5K
C6 3.3μF 25V
R10 150
R14 1.2K
R15 5.6K
R2 2.7M (0.5W)
R4 150
R8 6.8K
R12 130K
R5 100K
CT1 30PF
C4 18PF
C8 3PF
C9 4.7μF 25V
CT1 FREQUENCY RESPONCE ADJ
C
B
A
1
2
3
4

PREAMPLIFIER BOARD

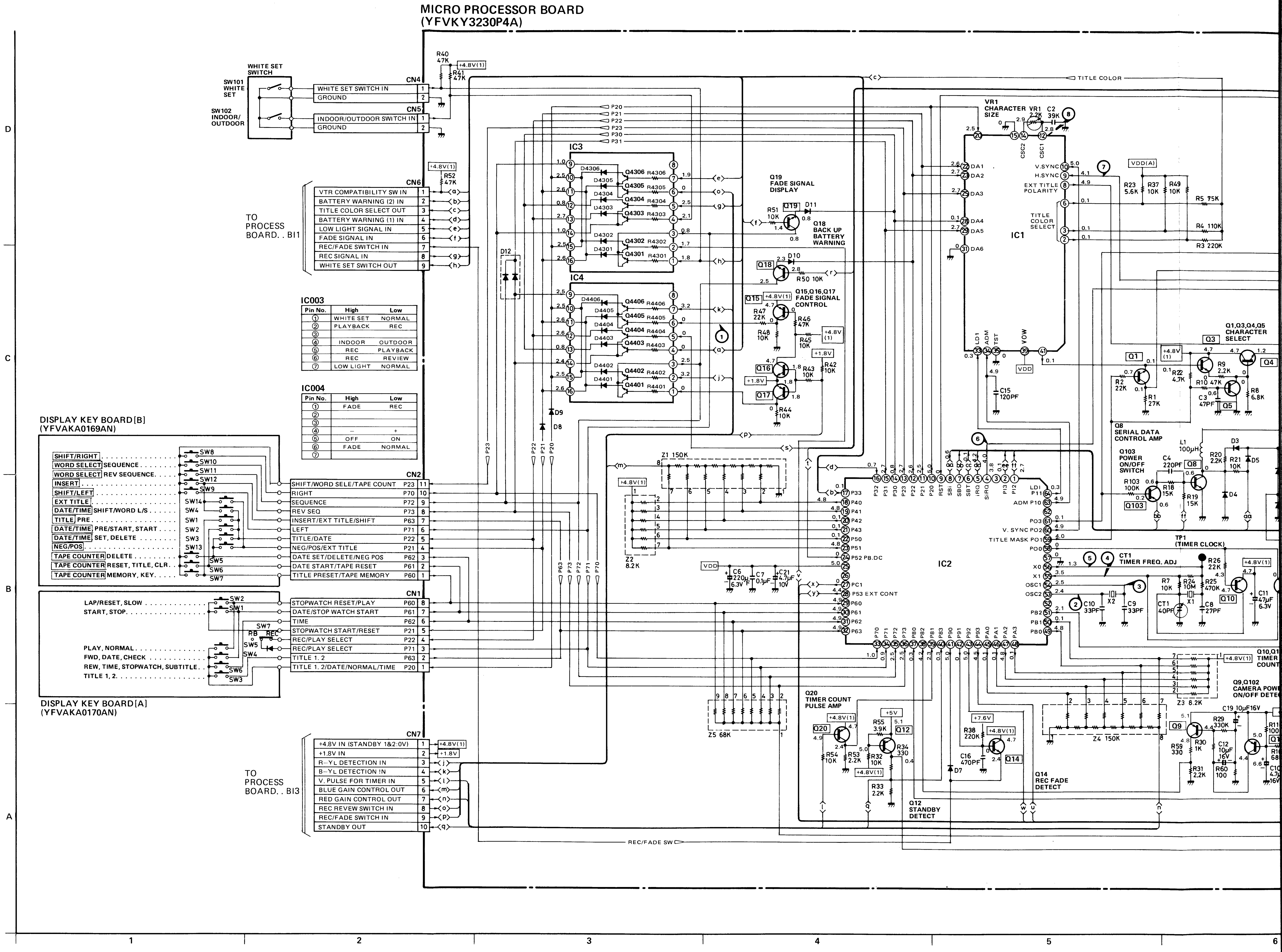
Q1	2SK316-PQ	[1K]	B2
Q2	2SA1022-CD	[E]	B3
Q3	2SC2404-CD	[U]	B3
Q4	2SA1022-CD	[E]	C4
Q5	2SD601-QRS	[Y]	B4
D1	MA165		B2

SCHEMATIC DIAGRAM OF MICRO PROCESSOR BOARD (YFVKY3230P4A)

Parts symbol numbers indicated by threefigures are located on the Micro Processor Subboard.

MICRO PROCESSOR BOARD

IC1	MN1237B		D5
IC2	MN1554CVA		B5
IC3	AN90B82S		D3
IC4	AN90B82S		C3
Q1	2SC2404-CD	[U]	C5
Q2	2SB709-QRS	[A]	C7
Q3	2SD601-QRS	[Y]	C6
Q4	2SD601-QRS	[Y]	C6
Q5	2SD601-QRS	[Y]	C6
Q6	2SD601-QRS	[Y]	B6
Q7	2SD601-QRS	[Y]	B6
Q8	2SD601-QRS	[Y]	B6
Q9	2SB814-QRS	[1B]	A6
Q10	2SA1022-CD	[E]	B6
Q11	2SC2404-CD	[U]	B6
Q12	2SB709-QRS	[A]	A4
Q13	2SD602-QRS	[W]	B6
Q14	2SD601-QRS	[Y]	A5
Q15	2SB709-QRS	[A]	C4
Q16	2SD601-QRS	[Y]	C4
Q17	2SB709-QRS	[A]	C4
Q18	2SD601-QRS	[Y]	C4
Q19	2SD601-QRS	[Y]	D4
Q20	2SB709-QRS	[A]	A4
Q21	2SD601-QRS	[Y]	B6
Q101	2SB709-QRS	[A]	C7
Q102	2SB709-QRS	[A]	A6
Q103	2SB709-QRS	[A]	B5
Q104	2SD601-QRS	[Y]	C6
Q105	2SD1030RST	[1Z]	C7
Q106	2SB709-QRS	[A]	B6
D1	MA151K	[MH]	C6
D2	MA151K	[MH]	B6
D3	MA151K	[MH]	C6
D4	MA151K	[MH]	B6
D5	MA151K	[MH]	C6
D6	MA151K	[MH]	B6
D7	MA151K	[MH]	A5
D8	MA151K	[MH]	C3
D9	MA151K	[MH]	C3
D10	MA151K	[MH]	C4
D11	MA151K	[MH]	D4
D12	MA151K	[MH]	C3


MICRO PROCESSOR BOARD
(YFVKY3230P4A)
D
C
B
A
1
2
3
4
5
6
WHITE SET SWITCH
SW101 WHITE SET
SW102 INDOOR/ OUTDOOR
CN4
WHITE SET SWITCH IN
GROUND
CN5
INDOOR/OUTDOOR SWITCH IN
GROUND
CN6
TO PROCESS BOARD. . BI1
VTR COMPATIBILITY SW IN
BATTERY WARNING (2) IN
TITLE COLOR SELECT OUT
BATTERY WARNING (1) IN
LOW LIGHT SIGNAL IN
FADE SIGNAL IN
REC/FADE SWITCH IN
REC SIGNAL IN
WHITE SET SWITCH OUT
IC3
IC4
TITLE COLOR
VR1 CHARACTER SIZE
IC1
V.SYNC
H.SYNC
EXT TITLE POLARITY
TITLE COLOR SELECT
Q19 FADE SIGNAL DISPLAY
Q18 BACK UP BATTERY WARNING
Q15,Q16,Q17 FADE SIGNAL CONTROL
Q1,Q3,Q4,Q5 CHARACTER SELECT
Q8 SERIAL DATA CONTROL AMP
Q103 POWER ON/OFF SWITCH
TP1 (TIMER CLOCK)
CT1 TIMER FREQ. ADJ
IC2
DISPLAY KEY BOARD[B]
(YFVAKA0169AN)
SHIFT/RIGHT
WORD SELECT SEQUENCE
WORD SELECT REV SEQUENCE
INSERT
SHIFT/LEFT
EXT TITLE
DATE/TIME SHIFT/WORD L/S
TITLE PRE
DATE/TIME PRE/START, START
DATE/TIME SET, DELETE
NEG/POS
TAPE COUNTER DELETE
TAPE COUNTER RESET, TITLE, CLR.
TAPE COUNTER MEMORY, KEY.
CN2
SHIFT/WORD SELE/TAPE COUNT P23
RIGHT P70
SEQUENCE P72
REV SEQ P73
INSERT/EXT TITLE/SHIFT P63
LEFT P71
TITLE/DATE P22
NEG/POS/EXT TITLE P21
DATE SET/DELETE/NEG POS P62
DATE START/TAPE RESET P61
TITLE PRESET/TAPE MEMORY P60
CN1
LAP/RESET, SLOW
START, STOP.
PLAY, NORMAL.
FWD, DATE, CHECK
REW, TIME, STOPWATCH, SUBTITLE.
TITLE 1, 2.
STOPWATCH RESET/PLAY P60
DATE/STOP WATCH START P61
TIME P62
STOPWATCH START/RESET P21
REC/PLAY SELECT P22
REC/PLAY SELECT P71
TITLE 1. 2 P63
TITLE 1. 2/DATE/NORMAL/TIME P20
DISPLAY KEY BOARD[A]
(YFVAKA0170AN)
CN7
TO PROCESS BOARD. . BI3
+4.8V IN (STANDBY 1&2:0V)
+1.8V IN
R–YL DETECTION IN
B–YL DETECTION IN
V. PULSE FOR TIMER IN
BLUE GAIN CONTROL OUT
RED GAIN CONTROL OUT
REC REVIEW SWITCH IN
REC/FADE SWITCH IN
STANDBY OUT
Z1 150K
Z2 8.2K
Z5 68K
Z4 150K
Z3 8.2K
Q20 TIMER COUNT PULSE AMP
Q12 STANDBY DETECT
Q14 REC FADE DETECT
Q10,Q11 TIMER COUNT
Q9,Q102 CAMERA POWER ON/OFF DETECT
REC/FADE SW

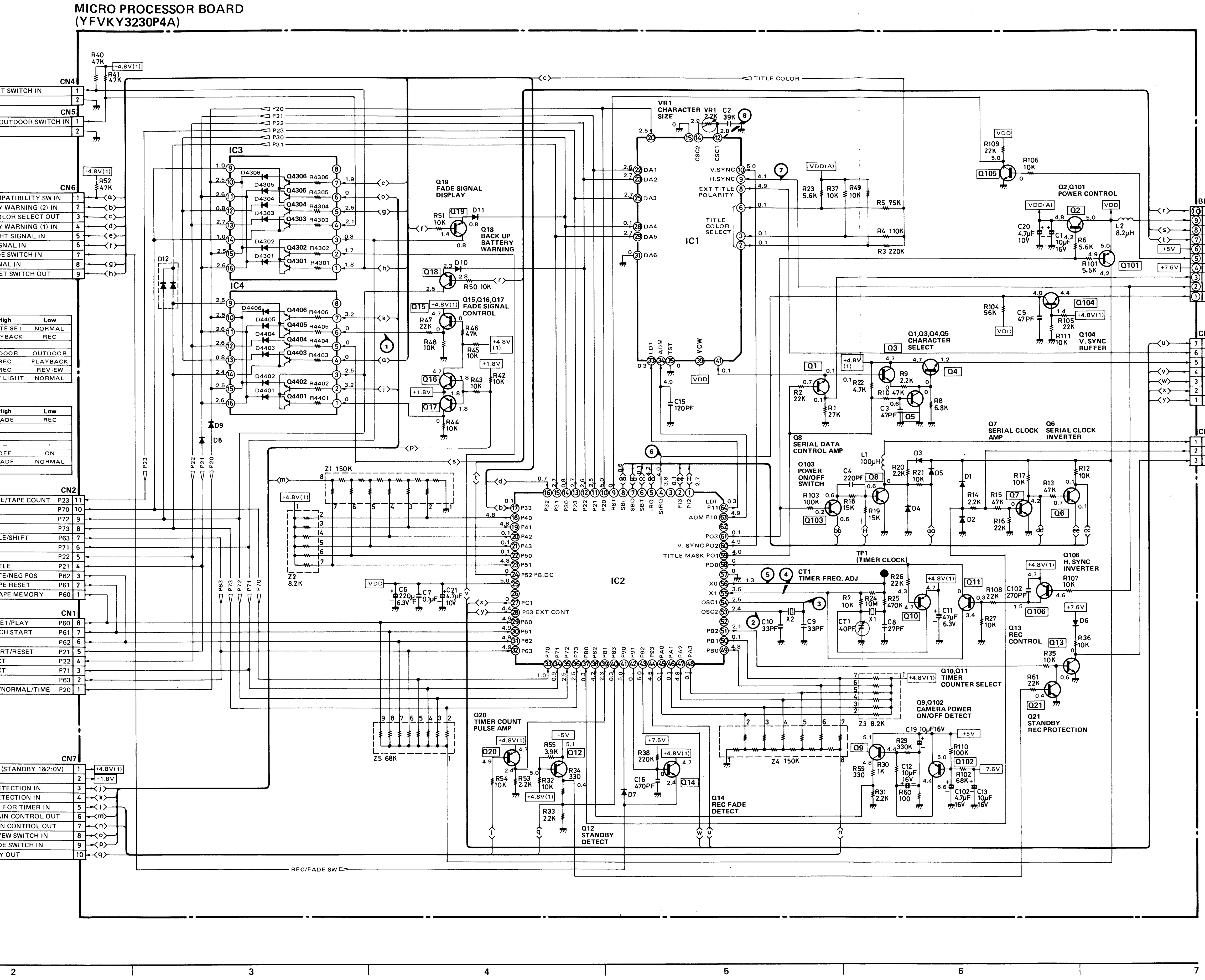
IC003

Pin No.	High	Low
①	WHITE SET	NORMAL
②	PLAYBACK	REC
③		
④	INDOOR	OUTDOOR
⑤	REC	PLAYBACK
⑥	REC	REVIEW
⑦	LOW LIGHT	NORMAL

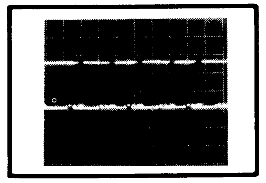
IC004

Pin No.	High	Low
①	FADE	REC
②		
③		
④	–	+
⑤	OFF	ON
⑥	FADE	NORMAL
⑦		

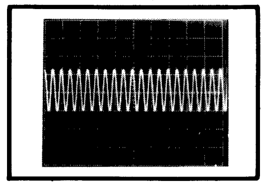
SCHEMATIC DIAGRAM OF MICRO PROCESSOR BOARD (YFVKY3230P4A)


MICRO PROCESSOR BOARD
(YFVKY3230P4A)
CN4
T SWITCH IN
CN5
OUTDOOR SWITCH IN
CN6
PATIBILITY SW IN
Y WARNING (2) IN
OLOR SELECT OUT
Y WARNING (1) IN
HT SIGNAL IN
GNAL IN
E SWITCH IN
NAL IN
ET SWITCH OUT
CN2
CN1
CN7
IC1
IC2
IC3
IC4
VR1 CHARACTER SIZE
Q19 FADE SIGNAL DISPLAY
Q18 BACK UP BATTERY WARNING
Q15,Q16,Q17 FADE SIGNAL CONTROL
Q105
Q2,Q101 POWER CONTROL
Q104 V. SYNC BUFFER
Q1,Q3,Q4,Q5 CHARACTER SELECT
Q7 SERIAL CLOCK AMP
Q6 SERIAL CLOCK INVERTER
Q8 SERIAL DATA CONTROL AMP
Q103 POWER ON/OFF SWITCH
TP1 (TIMER CLOCK)
CT1 TIMER FREQ. ADJ
Q106 H. SYNC INVERTER
Q13 REC CONTROL
Q10,Q11 TIMER COUNTER SELECT
Q9,Q102 CAMERA POWER ON/OFF DETECT
Q21 STANDBY REC PROTECTION
Q20 TIMER COUNT PULSE AMP
Q12 STANDBY DETECT
Q14 REC FADE DETECT
Z1 150K
Z2 8.2K
Z3 8.2K
Z4 150K
Z5 68K
TITLE COLOR
REC/FADE SW
BI1
BACK-UP WARNING IN
VDD IN
BEAM DETECT IN
PLAY BACK CONTROL IN
+5V IN
CPU RESET IN
+7.6V IN
CHARACTER OUT
H. SYNC IN
V. SYNC IN
TO DEFLECTION BOARD. . CN6
CN8
NEGA/POSI CONTROL OUT
EXT TITLE POLARITY OUT
EXT VIDEO OUT
PLAY BACK CONTROL IN
REC RESET OUT
TITLE COLOR CORRECT OUT
EXT TITLE CONT OUT
TO PROCESS BOARD. . BI2
CN3
SERIAL DATA IN/OUT
SERIAL CLOCK IN
VTR REC CONTROL OUT
TO FADE/AGC SWITCH BOARD...BI3 ③
TO CN201 ③
2
3
4
5
6
7

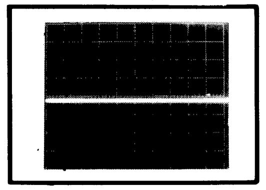
1 1V/DIV, 5ms/DIV



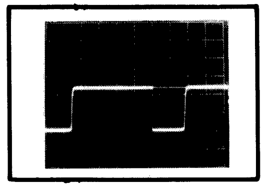
2 2V/DIV, 0.5μs/DIV



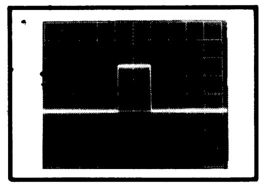
3 2V/DIV, 0.5μs/DIV



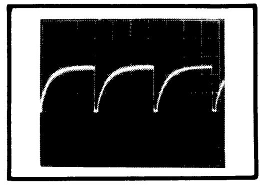
4 2V/DIV, 10μs/DIV



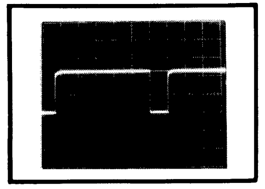
5 2V/DIV, 10μs/DIV



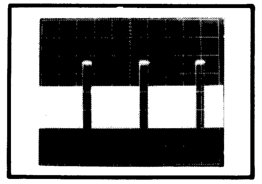
6 2V/DIV, 5ms/DIV



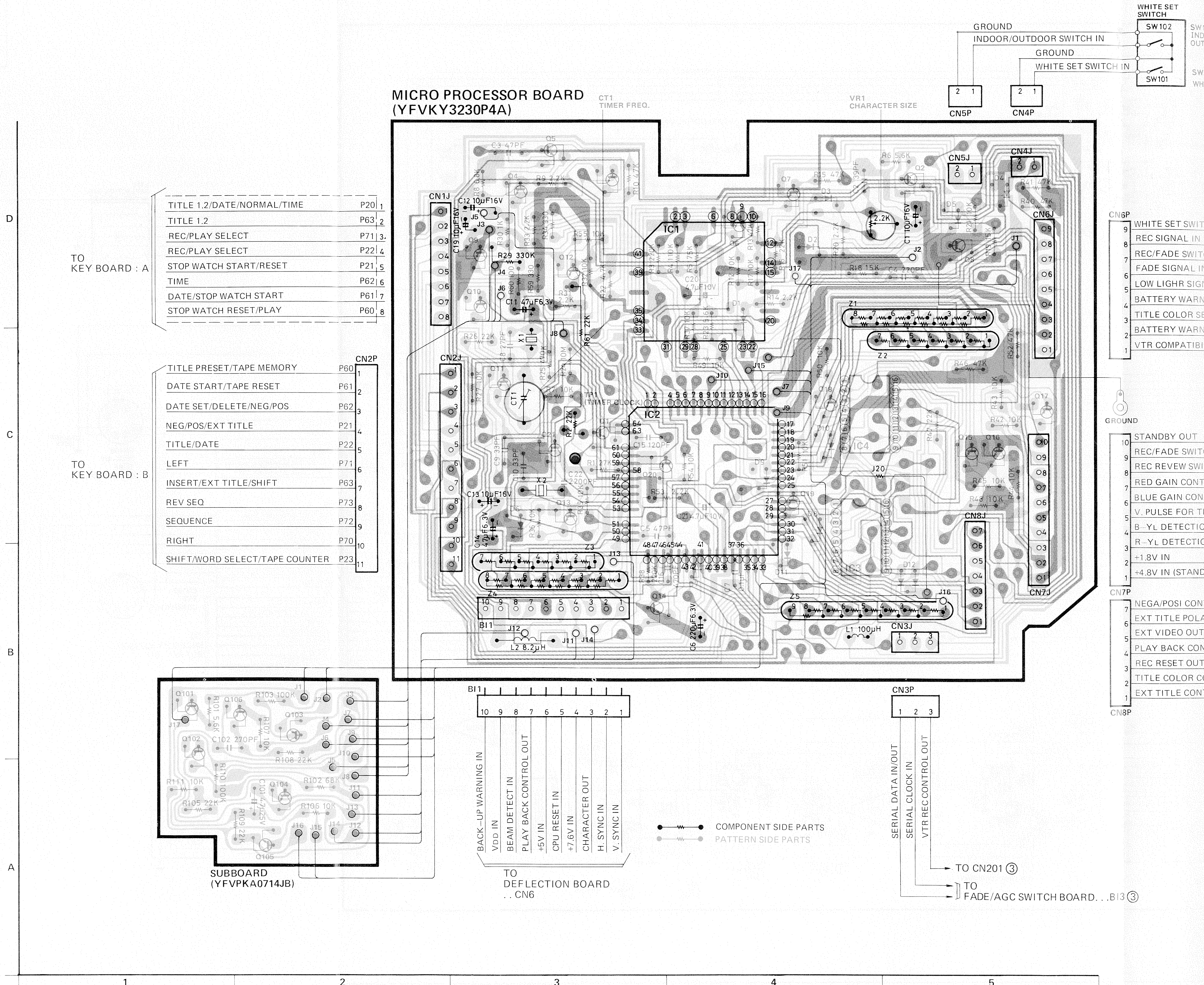
7 2V/DIV, 10μs/DIV



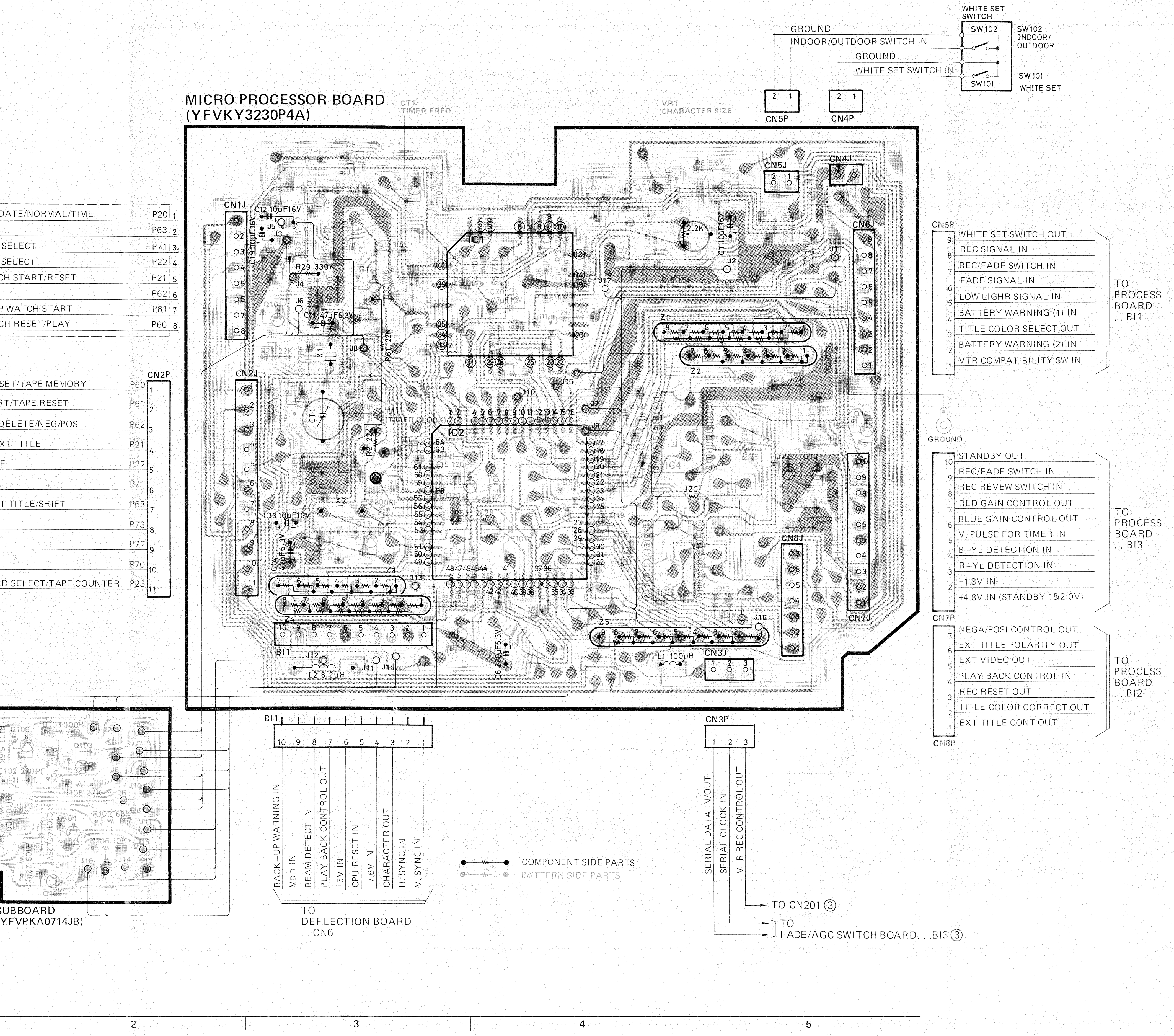
8 1V/DIV, 20μs/DIV



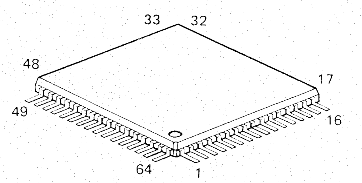
CONDUCTOR VIEW OF MICRO PROCESSOR BOARD (YFVKY3230P4A)


MICRO PROCESSOR BOARD
(YFVKY3230P4A)
CT1
TIMER FREQ.
VR1
CHARACTER SIZE
WHITE SET SWITCH
SW102
SW101
GROUND
INDOOR/OUTDOOR SWITCH IN
GROUND
WHITE SET SWITCH IN
CN5P
CN4P
CN5J
CN4J
CN1J
CN2J
CN6J
CN8J
CN7J
CN3J
IC1
IC2
IC4
Z1
Z2
Z3
Z4
Z5
TO
KEY BOARD : A
TITLE 1.2/DATE/NORMAL/TIME P20 1
TITLE 1.2 P63 2
REC/PLAY SELECT P71 3
REC/PLAY SELECT P22 4
STOP WATCH START/RESET P21 5
TIME P62 6
DATE/STOP WATCH START P61 7
STOP WATCH RESET/PLAY P60 8
TO
KEY BOARD : B
CN2P
TITLE PRESET/TAPE MEMORY P60 1
DATE START/TAPE RESET P61 2
DATE SET/DELETE/NEG/POS P62 3
NEG/POS/EXT TITLE P21 4
TITLE/DATE P22 5
LEFT P71 6
INSERT/EXT TITLE/SHIFT P63 7
REV SEQ P73 8
SEQUENCE P72 9
RIGHT P70 10
SHIFT/WORD SELECT/TAPE COUNTER P23 11
CN6P
9 WHITE SET SWITC
8 REC SIGNAL IN
7 REC/FADE SWITC
6 FADE SIGNAL IN
5 LOW LIGHR SIGN
4 BATTERY WARNI
3 TITLE COLOR SEL
2 BATTERY WARNI
1 VTR COMPATIBIL
GROUND
10 STANDBY OUT
9 REC/FADE SWITC
8 REC REVEW SWIT
7 RED GAIN CONTR
6 BLUE GAIN CONT
5 V. PULSE FOR TIM
4 B-YL DETECTION
3 R-YL DETECTION
2 +1.8V IN
1 +4.8V IN (STANDB
CN7P
7 NEGA/POSI CONT
6 EXT TITLE POLAR
5 EXT VIDEO OUT
4 PLAY BACK CONT
3 REC RESET OUT
2 TITLE COLOR CO
1 EXT TITLE CONT
CN8P
BI1
BACK-UP WARNING IN
VDD IN
BEAM DETECT IN
PLAY BACK CONTROL OUT
+5V IN
CPU RESET IN
+7.6V IN
CHARACTER OUT
H. SYNC IN
V. SYNC IN
TO
DEFLECTION BOARD
. . CN6
COMPONENT SIDE PARTS
PATTERN SIDE PARTS
CN3P
SERIAL DATA IN/OUT
SERIAL CLOCK IN
VTR RECCONTROL OUT
TO CN201 ③
TO
FADE/AGC SWITCH BOARD. . .BI3 ③
SUBBOARD
(YFVPKA0714JB)
A
B
C
D
1
2
3
4
5

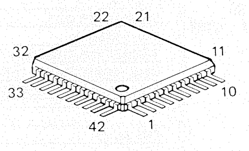
CONDUCTOR VIEW OF MICRO PROCESSOR BOARD (YFVKY3230P4A)


MICRO PROCESSOR BOARD
(YFVKY3230P4A)
CT1 TIMER FREQ.
VR1 CHARACTER SIZE
WHITE SET SWITCH
GROUND
INDOOR/OUTDOOR SWITCH IN
GROUND
WHITE SET SWITCH IN
SW102 INDOOR/OUTDOOR
SW101 WHITE SET
CN5P
CN4P
CN5J
CN4J
CN1J
CN2J
CN6J
CN7J
CN8J
CN3J
BI1
IC1
IC2
IC3
IC4
X1
X2
Z1
Z2
Z3
Z4
Z5
L1 100μH
L2 8.2μH
DATE/NORMAL/TIME P20 1
P63 2
SELECT P71 3
SELECT P22 4
CH START/RESET P21 5
P62 6
P WATCH START P61 7
CH RESET/PLAY P60 8
CN2P
SET/TAPE MEMORY P60 1
RT/TAPE RESET P61 2
DELETE/NEG/POS P62 3
XT TITLE P21 4
E P22 5
P71 6
T TITLE/SHIFT P63 7
P73 8
P72 9
P70 10
D SELECT/TAPE COUNTER P23 11
CN6P
9 WHITE SET SWITCH OUT
8 REC SIGNAL IN
7 REC/FADE SWITCH IN
6 FADE SIGNAL IN
5 LOW LIGHR SIGNAL IN
4 BATTERY WARNING (1) IN
3 TITLE COLOR SELECT OUT
2 BATTERY WARNING (2) IN
1 VTR COMPATIBILITY SW IN
TO PROCESS BOARD ..BI1
GROUND
CN7P
10 STANDBY OUT
9 REC/FADE SWITCH IN
8 REC REVEW SWITCH IN
7 RED GAIN CONTROL OUT
6 BLUE GAIN CONTROL OUT
5 V. PULSE FOR TIMER IN
4 B–YL DETECTION IN
3 R–YL DETECTION IN
2 +1.8V IN
1 +4.8V IN (STANDBY 1&2:0V)
TO PROCESS BOARD ..BI3
CN8P
7 NEGA/POSI CONTROL OUT
6 EXT TITLE POLARITY OUT
5 EXT VIDEO OUT
4 PLAY BACK CONTROL IN
3 REC RESET OUT
2 TITLE COLOR CORRECT OUT
1 EXT TITLE CONT OUT
TO PROCESS BOARD ..BI2
BI1 10 9 8 7 6 5 4 3 2 1
BACK–UP WARNING IN
VDD IN
BEAM DETECT IN
PLAY BACK CONTROL OUT
+5V IN
CPU RESET IN
+7.6V IN
CHARACTER OUT
H. SYNC IN
V. SYNC IN
TO DEFLECTION BOARD ..CN6
CN3P 1 2 3
SERIAL DATA IN/OUT
SERIAL CLOCK IN
VTR RECCONTROL OUT
TO CN201 ③
TO FADE/AGC SWITCH BOARD...BI3 ③
COMPONENT SIDE PARTS
PATTERN SIDE PARTS
SUBBOARD
(YFVPKA0714JB)
2
3
4
5

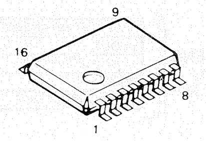
MN1554CVA


33
32
48
17
49
16
64
1

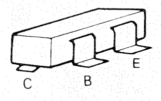
MN1237B


22
21
32
11
33
10
42
1

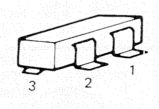
AN90B82S



2SD602-QRS
2SD601-QRS
2SC2404-CD
2SB814-RS
2SB709-QRS
2SA1022-CD



MA151K

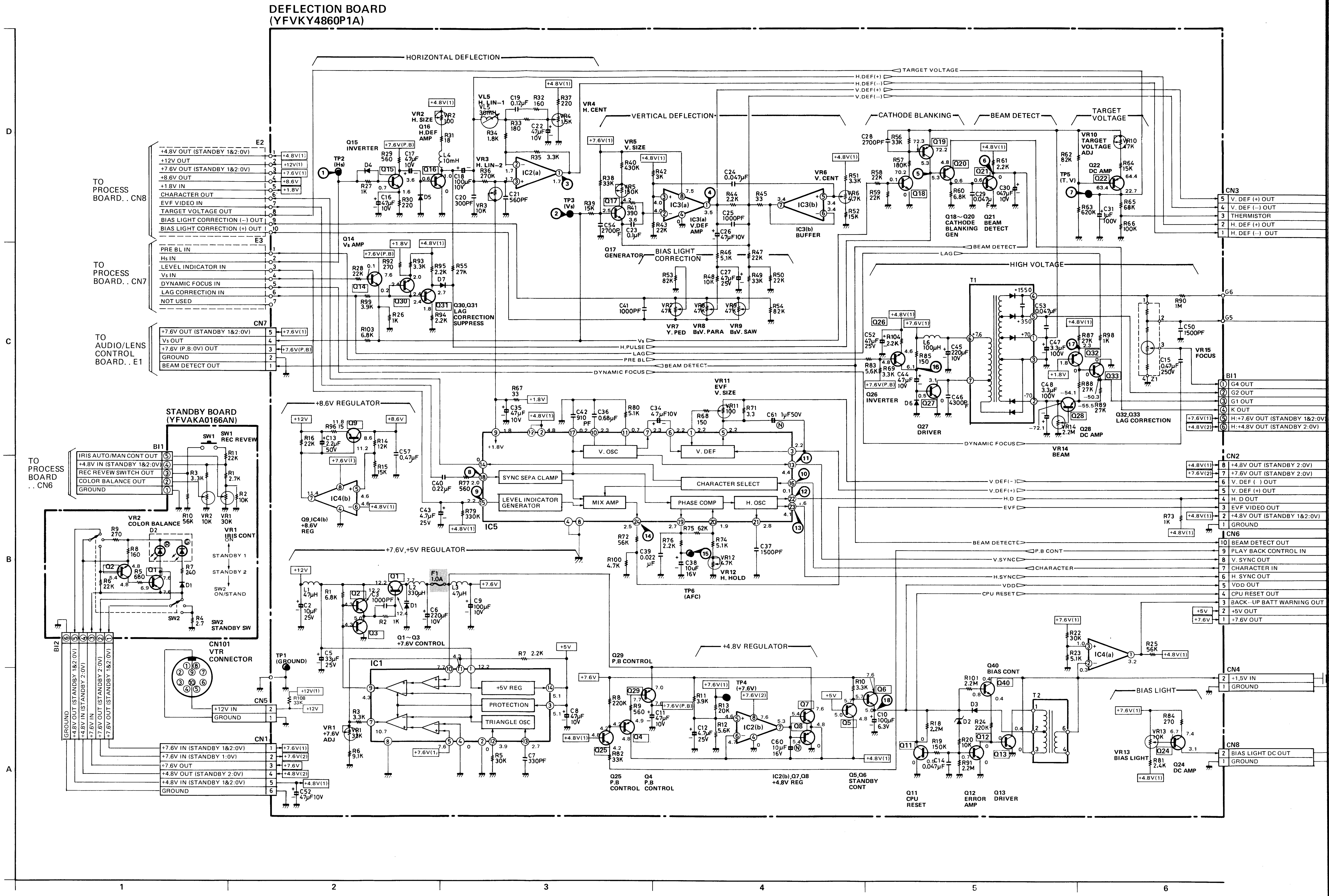


1 : NC
2 : Anode
3 : Cathode

MICRO PROCESSOR BOARD

IC1	MN1237B		D3
IC2	MN1554CVA		C4
IC3	AN90B82S		B4
IC4	AN90B82S		C4
Q1	2SC2404-CD	[U]	C3
Q2	2SB709-QRS	[A]	D5
Q3	2SD601-QRS	[Y]	D3
Q4	2SD601-QRS	[Y]	D3
Q5	2SD601-QRS	[Y]	D3
Q6	2SD601-QRS	[Y]	D4
Q7	2SD601-QRS	[Y]	D4
Q8	2SD601-QRS	[Y]	D5
Q9	2SB814-QRS	[1B]	D3
Q10	2SA1022-CD	[E]	D3
Q11	2SC2404-CD	[U]	C3
Q12	2SB709-QRS	[A]	D3
Q13	2SD602-QRS	[W]	C3
Q14	2SD601-QRS	[Y]	B3
Q15	2SB709-QRS	[A]	C5
Q16	2SD601-QRS	[Y]	C5
Q17	2SB709-QRS	[A]	C5
Q18	2SD601-QRS	[Y]	D4
Q19	2SD601-QRS	[Y]	D4
Q20	2SB709-QRS	[A]	C3
Q21	2SD601-QRS	[Y]	C3
Q101	2SB709-QRS	[A]	B1
Q102	2SB709-QRS	[A]	B1
Q103	2SB709-QRS	[A]	B2
Q104	2SD601-QRS	[Y]	A2
Q105	2SD1030RST	[1Z]	A2
Q106	2SB709-QRS	[A]	B2
D1	MA151K	[MH]	D4
D2	MA151K	[MH]	D4
D3	MA151K	[MH]	D4
D4	MA151K	[MH]	D5
D5	MA151K	[MH]	D5
D6	MA151K	[MH]	C3
D7	MA151K	[MH]	B4
D8	MA151K	[MH]	C4
D9	MA151K	[MH]	C4
D10	MA151K	[MH]	C4
D11	MA151K	[MH]	B4
D12	MA151K	[MH]	B5

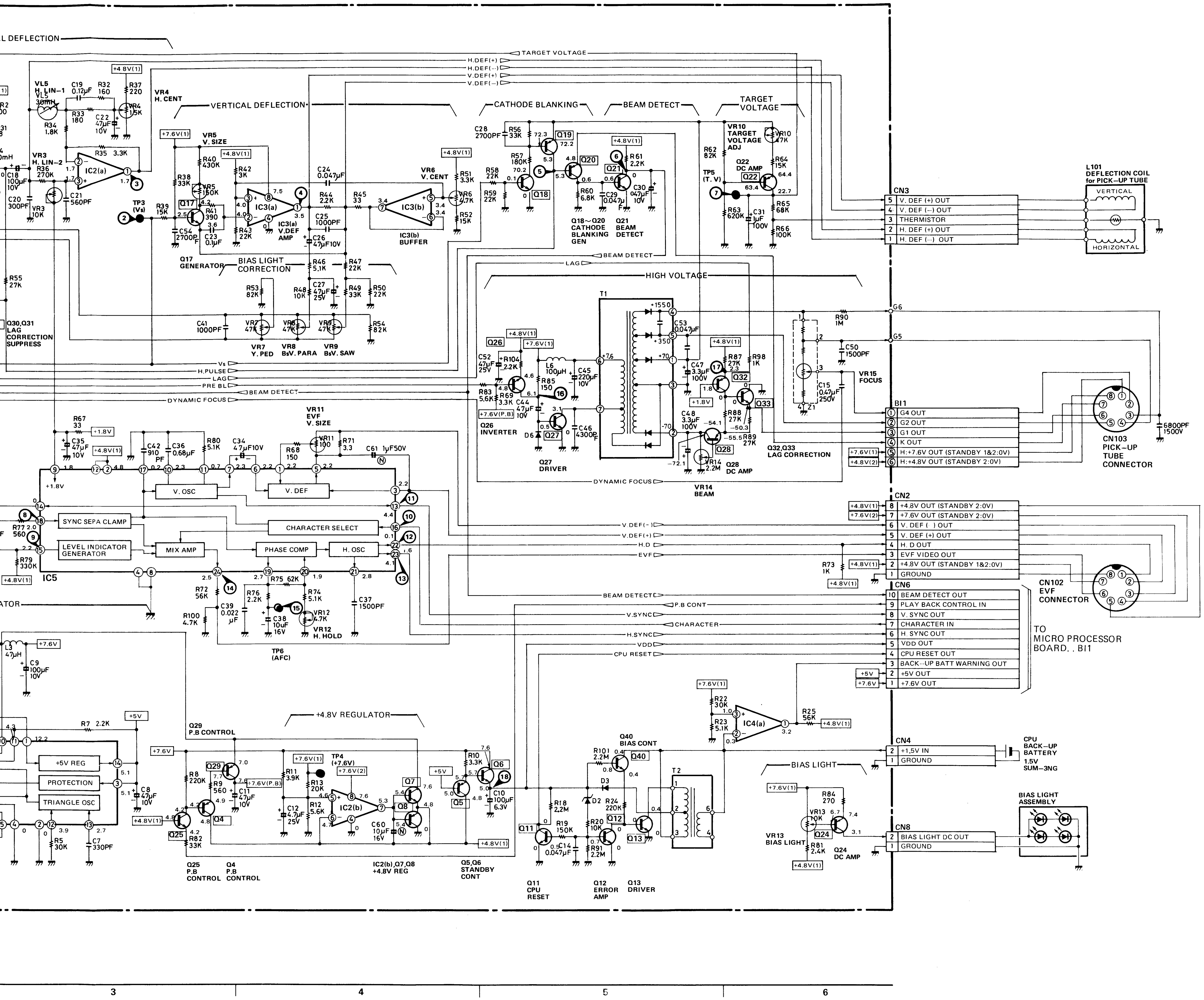
SCHEMATIC DIAGRAM OF DEFLECTION BOARD (YFVKY4860P1A)


DEFLECTION BOARD
(YFVKY4860P1A)
HORIZONTAL DEFLECTION
VERTICAL DEFLECTION
CATHODE BLANKING
BEAM DETECT
TARGET VOLTAGE
HIGH VOLTAGE
BIAS LIGHT CORRECTION
+8.6V REGULATOR
+7.6V,+5V REGULATOR
+4.8V REGULATOR
BIAS LIGHT
TO PROCESS BOARD. . CN8
E2
+4.8V OUT (STANDBY 1&2:0V)
+12V OUT
+7.6V OUT (STANDBY 1&2:0V)
+8.6V OUT
+1.8V IN
CHARACTER OUT
EVF VIDEO IN
TARGET VOLTAGE OUT
BIAS LIGHT CORRECTION (−) OUT
BIAS LIGHT CORRECTION (+) OUT
TO PROCESS BOARD. . CN7
E3
PRE BL IN
Hs IN
LEVEL INDICATOR IN
Vs IN
DYNAMIC FOCUS IN
LAG CORRECTION IN
NOT USED
TO AUDIO/LENS CONTROL BOARD. . E1
CN7
+7.6V OUT (STANDBY 1&2:0V)
Vs OUT
+7.6V (P.B:0V) OUT
GROUND
BEAM DETECT OUT
STANDBY BOARD
(YFVAKA0166AN)
TO PROCESS BOARD . . CN6
BI1
IRIS AUTO/MAN CONT OUT
+4.8V IN (STANDBY 1&2:0V)
REC REVEW SWITCH OUT
COLOR BALANCE OUT
GROUND
SW1 REC REVEW
VR2 COLOR BALANCE
VR1 IRIS CONT
STANDBY 1
STANDBY 2
SW2 ON/STAND
SW2 STANDBY SW
BI2
GROUND
+4.8V OUT (STANDBY 1&2:0V)
+4.8V IN (STANDBY 2:0V)
+7.6V IN
+7.6V OUT (STANDBY 2:0V)
+7.6V OUT (STANDBY 1&2:0V)
CN101 VTR CONNECTOR
TP1 (GROUND)
CN5
+12V IN
GROUND
CN1
+7.6V IN (STANDBY 1&2:0V)
+7.6V IN (STANDBY 1:0V)
+7.6V OUT
+4.8V OUT (STANDBY 2:0V)
+4.8V IN (STANDBY 1&2:0V)
GROUND
Q15 INVERTER
Q16 H.DEF AMP
VR2 H. SIZE
VL5 H. LIN−1
VR3 H. LIN−2
VR4 H. CENT
IC2(a)
TP2 (Hs)
TP3 (Vs)
Q14 Vs AMP
Q30,Q31 LAG CORRECTION SUPPRESS
VR5 V. SIZE
Q17 GENERATOR
IC3(a) V.DEF AMP
VR6 V. CENT
IC3(b) BUFFER
Q18~Q20 CATHODE BLANKING GEN
Q21 BEAM DETECT
VR10 TARGET VOLTAGE ADJ
Q22 DC AMP
TP5 (T. V)
VR7 Y. PED
VR8 BsV. PARA
VR9 BsV. SAW
TARGET VOLTAGE
H.DEF(+)
H.DEF(−)
V.DEF(+)
V.DEF(−)
BEAM DETECT
LAG
T1
Q26 INVERTER
Q27 DRIVER
Q28 DC AMP
VR14 BEAM
Q32,Q33 LAG CORRECTION
VR15 FOCUS
CN3
V. DEF (+) OUT
V. DEF (−) OUT
THERMISTOR
H. DEF (+) OUT
H. DEF (−) OUT
G6
G5
BI1
G4 OUT
G2 OUT
G1 OUT
K OUT
H:+7.6V OUT (STANDBY 1&2:0V)
H:+4.8V OUT (STANDBY 2:0V)
Vs
H.PULSE
LAG
PRE BL
BEAM DETECT
DYNAMIC FOCUS
Q9,IC4(b) +8.6V REG
IC4(b)
VR11 EVF V. SIZE
IC5
SYNC SEPA CLAMP
LEVEL INDICATOR GENERATOR
MIX AMP
V. OSC
V. DEF
CHARACTER SELECT
PHASE COMP
H. OSC
VR12 H. HOLD
TP6 (AFC)
CN2
+4.8V OUT (STANDBY 2:0V)
+7.6V OUT (STANDBY 2:0V)
V. DEF (−) OUT
V. DEF (+) OUT
H. D OUT
EVF VIDEO OUT
+4.8V OUT (STANDBY 1&2:0V)
GROUND
CN6
BEAM DETECT OUT
PLAY BACK CONTROL IN
V. SYNC OUT
CHARACTER IN
H. SYNC OUT
VDD OUT
CPU RESET OUT
BACK- UP BATT WARNING OUT
+5V OUT
+7.6V OUT
P.B CONT
CHARACTER
V.SYNC
H.SYNC
VDD
CPU RESET
EVF
H.D
F1 1.0A
Q1~Q3 +7.6V CONTROL
IC1
+5V REG
PROTECTION
TRIANGLE OSC
VR1 +7.6V ADJ
Q29 P.B CONTROL
TP4 (+7.6V)
IC2(b)
Q25 P.B CONTROL
Q4 P.B CONTROL
IC2(b),Q7,Q8 +4.8V REG
Q5,Q6 STANDBY CONT
Q40 BIAS CONT
T2
Q11 CPU RESET
Q12 ERROR AMP
Q13 DRIVER
IC4(a)
CN4
+1,5V IN
GROUND
VR13 BIAS LIGHT
Q24 DC AMP
CN8
BIAS LIGHT DC OUT
GROUND
A
B
C
D
1
2
3
4
5
6

SCHEMATIC DIAGRAM OF DEFLECTION BOARD (YFVKY4860P1A)

PRODUCT SAFETY NOTE

The shaded area on this schematic diagram incorporates special features important for protection from X-Radiation, fire and electrical shock hazards. When servicing it is essential that only manufacturer's specified parts be used for the critical components in the shaded areas of the schematic.



L DEFLECTION
TARGET VOLTAGE
H.DEF(+)
H.DEF(–)
V.DEF(+)
V.DEF(–)
VERTICAL DEFLECTION
CATHODE BLANKING
BEAM DETECT
TARGET VOLTAGE
VL5 H. LIN-1
VR3 H. LIN-2
VR4 H. CENT
VR5 V. SIZE
VR6 V. CENT
VR10 TARGET VOLTAGE ADJ
IC2(a)
IC3(a) V.DEF AMP
IC3(b) BUFFER
TP3 (Vs)
TP5 (T. V)
Q17 GENERATOR
BIAS LIGHT CORRECTION
Q18~Q20 CATHODE BLANKING GEN
Q21 BEAM DETECT
Q22 DC AMP
VR7 Y. PED
VR8 BsV. PARA
VR9 BsV. SAW
Q30,Q31 LAG CORRECTION SUPPRESS
Vs
H.PULSE
LAG
PRE BL
BEAM DETECT
DYNAMIC FOCUS
HIGH VOLTAGE
T1
Q26 INVERTER
Q27 DRIVER
Q32,Q33 LAG CORRECTION
Q28 DC AMP
VR14 BEAM
VR15 FOCUS
VR11 EVF V. SIZE
V. OSC
V. DEF
SYNC SEPA CLAMP
CHARACTER SELECT
LEVEL INDICATOR GENERATOR
MIX AMP
PHASE COMP
H. OSC
IC5
VR12 H. HOLD
TP6 (AFC)
+5V REG
PROTECTION
TRIANGLE OSC
Q29 P.B CONTROL
+4.8V REGULATOR
TP4 (+7.6V)
IC2(b)
Q25 P.B CONTROL
Q4 P.B CONTROL
IC2(b),Q7,Q8 +4.8V REG
Q5,Q6 STANDBY CONT
Q40 BIAS CONT
T2
Q11 CPU RESET
Q12 ERROR AMP
Q13 DRIVER
IC4(a)
BIAS LIGHT
VR13 BIAS LIGHT
Q24 DC AMP
L101 DEFLECTION COIL for PICK-UP TUBE
VERTICAL
HORIZONTAL
CN3
5 V. DEF (+) OUT
4 V. DEF (–) OUT
3 THERMISTOR
2 H. DEF (+) OUT
1 H. DEF (–) OUT
G6
G5
BI1
① G4 OUT
② G2 OUT
③ G1 OUT
④ K OUT
⑤ H:+7.6V OUT (STANDBY 1&2:0V)
⑥ H:+4.8V OUT (STANDBY 2:0V)
CN103 PICK-UP TUBE CONNECTOR
6800PF 1500V
CN2
8 +4.8V OUT (STANDBY 2:0V)
7 +7.6V OUT (STANDBY 2:0V)
6 V. DEF ( ) OUT
5 V. DEF (+) OUT
4 H. D OUT
3 EVF VIDEO OUT
2 +4.8V OUT (STANDBY 1&2:0V)
1 GROUND
CN102 EVF CONNECTOR
CN6
10 BEAM DETECT OUT
9 PLAY BACK CONTROL IN
8 V. SYNC OUT
7 CHARACTER IN
6 H. SYNC OUT
5 VDD OUT
4 CPU RESET OUT
3 BACK-UP BATT WARNING OUT
2 +5V OUT
1 +7.6V OUT
TO MICRO PROCESSOR BOARD, BI1
CN4
2 +1,5V IN
1 GROUND
CPU BACK-UP BATTERY 1.5V SUM-3NG
CN8
2 BIAS LIGHT DC OUT
1 GROUND
BIAS LIGHT ASSEMBLY
P.B CONT
V.SYNC
CHARACTER
H.SYNC
VDD
CPU RESET
3
4
5
6

DEFLECTION BOARD

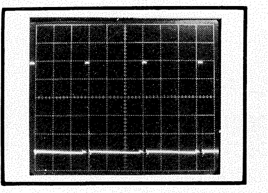
IC1	NJM2048MC		A2
IC2	NJM3415M		A4,D3
IC3	NJM3415M		D4
IC4	NJM2903M		B2,B6
IC5	AN2510S		C3,B3
Q1	2SB837-CD		B2
Q2	2SD601-QRS	[Y]	B2
Q3	2SB709-QRS	[A]	B2
Q4	2SB709-QRS	[A]	A3
Q5	2SB709-QRS	[A]	A4
Q6	2SD601-QRS	[Y]	A5
Q7	2SD973-QRS		A4
Q8	2SB710-QRS	[C]	A4
Q9	2SB710-QRS	[C]	C2
Q11	2SD1030RST	[1Z]	A5
Q12	2SC2404-CD	[U]	A5
Q13	2SD1030-T	[1Z]	A5
Q14	2SD601-QRS	[Y]	C2
Q15	2SD602-QRS	[W]	D2
Q16	2SD1083		D2
Q17	2SC2405STU	[S]	D3
Q18	2SD814-QRS	[P]	D5
Q19	2SB814-QRS	[1B]	D5
Q20	2SB814-QRS	[1B]	D5
Q21	2SD601-QRS	[Y]	D5
Q22	2SB814-RS	[1B]	D6
Q24	2SB709-QRS	[A]	A3
Q25	2SD601-QRS	[Y]	A3
Q26	2SD602-QRS	[W]	C5
Q27	2SD1083		C5
Q28	2SB814-QRS	[1B]	C5
Q29	2SB793-RS		A3
Q30	2SD601-QRS	[Y]	C2
Q31	2SD601-QRS	[Y]	C2
Q32	2SB814-QRS	[1B]	C6
Q33	2SD814-QRS	[P]	C6
Q40	2SD1030RST	[1Z]	A5
D1	EK14		B2
D2	HZ3BLL		A5
D3	MA151K	[MH]	A5
D4	MA165		D2
D5	MA151K	[MH]	D2
D6	MA165		C5
D7	MA171		C3

STANDBY BOARD

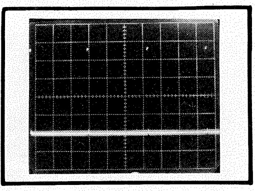
Q1	2SB793-QRS	B1
Q2	2SD636-QRS	B1
D1	MA165	B1
D2	LN11WP23F	B1

CONDUCTOR VIE

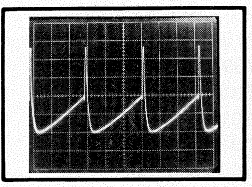
1 1V/DIV, 20µs/DIV



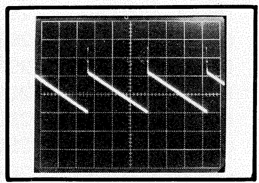
2 1V/DIV, 5ms/DIV



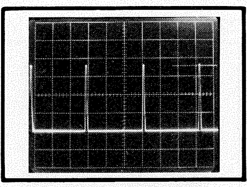
3 1V/DIV, 20µs/DIV



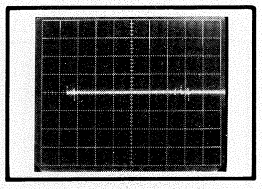
4 0.5V/DIV, 5ms/DIV



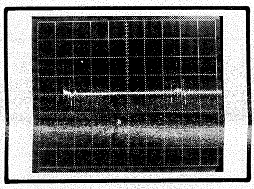
5 20V/DIV, 20µs/DIV



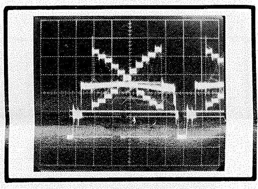
6 0.2V/DIV, 10µs/DIV



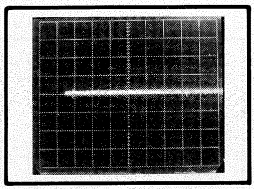
7 0.1V/DIV, 10µs/DIV



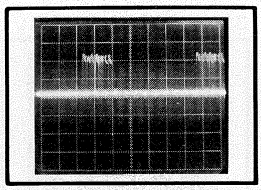
8 0.2V/DIV, 10µs/DIV



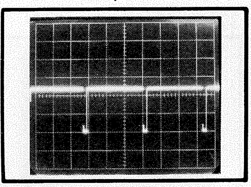
9 0.2V/DIV, 10µs/.



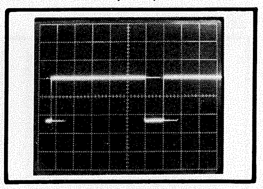
10 2V/DIV, 10µs/DIV



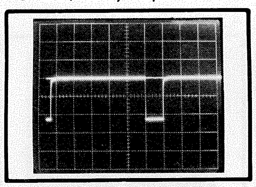
11 2V/DIV, 5ms/DIV



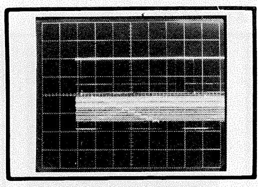
12 2V/DIV, 10µs/DIV



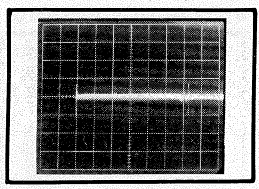
13 2V/DIV, 10µs/DIV



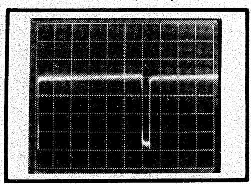
14 1V/DIV, 10µs/DIV



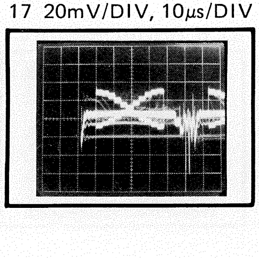
15 50mV/DIV, 10µs/DIV



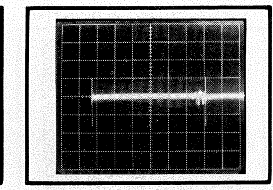
16 0.5V/DIV, 10µs/DIV



17 20mV/DIV, 10µs/DIV



18 20mV/DIV, 10µs/DIV



DEFLECTION BOARD

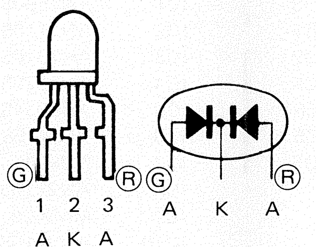
IC1	NJM2048MC		B3
IC2	NJM3415M		C3
IC3	NJM3415M		C2
IC4	NJM2903M		C4
IC5	AN2510S		C3
Q1	2SB837-CD		B3
Q2	2SD601-QRS	[Y]	B3
Q3	2SB709-QRS	[A]	B4
Q4	2SB709-QRS	[A]	C3
Q5	2SB709-QRS	[A]	C3
Q6	2SD601-QRS	[Y]	B3
Q7	2SD973-QRS		C3
Q8	2SB710-QRS	[C]	C3
Q9	2SB710-QRS	[C]	C4
Q11	2SD1030RST	[1Z]	C4
Q12	2SC2404-CD	[U]	C4
Q13	2SD1030-T	[1Z]	C4
Q14	2SD601-QRS	[Y]	C3
Q15	2SD602-QRS	[W]	C3
Q16	2SD1083		C3
Q17	2SC2405STU	[S]	C2
Q18	2SD814-QRS	[P]	C2
Q19	2SB814-QRS	[1B]	C2
Q20	2SB814-QRS	[1B]	C2
Q21	2SD601-QRS	[Y]	C2
Q22	2SB814-RS	[1B]	C2
Q24	2SB709-QRS	[A]	B2
Q25	2SD601-QRS	[Y]	C4
Q26	2SD602-QRS	[W]	C3
Q27	2SD1083		B3
Q28	2SB814-QRS	[1B]	B2
Q29	2SB793-RS		C3
Q30	2SD601-QRS	[Y]	B2
Q31	2SD601-QRS	[Y]	B2
Q32	2SB814-QRS	[1B]	B3
Q33	2SD814-QRS	[P]	B3
Q40	2SD1030RST	[1Z]	C4
D1	EK14		B3
D2	HZ3BLL		C4
D3	MA151K	[MH]	C4
D4	MA165		C3
D5	MA151K	[MH]	C3
D6	MA165		B3
D7	MA171		C2

STANDBY BOARD

Q1	2SB793-QRS	A5
Q2	2SD636-QRS	A6
D1	MA165	B5
D2	LN11WP23F	B5

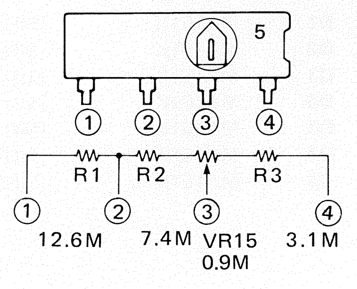
STANDBY BOARD

LN11WP23F

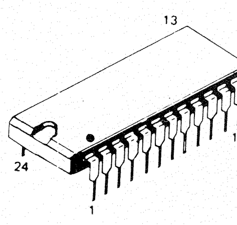

G
R
G
R
1 2 3
A K A
A K A

BLOCK RESISTOR

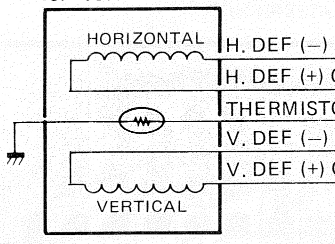
EVM71GA00114

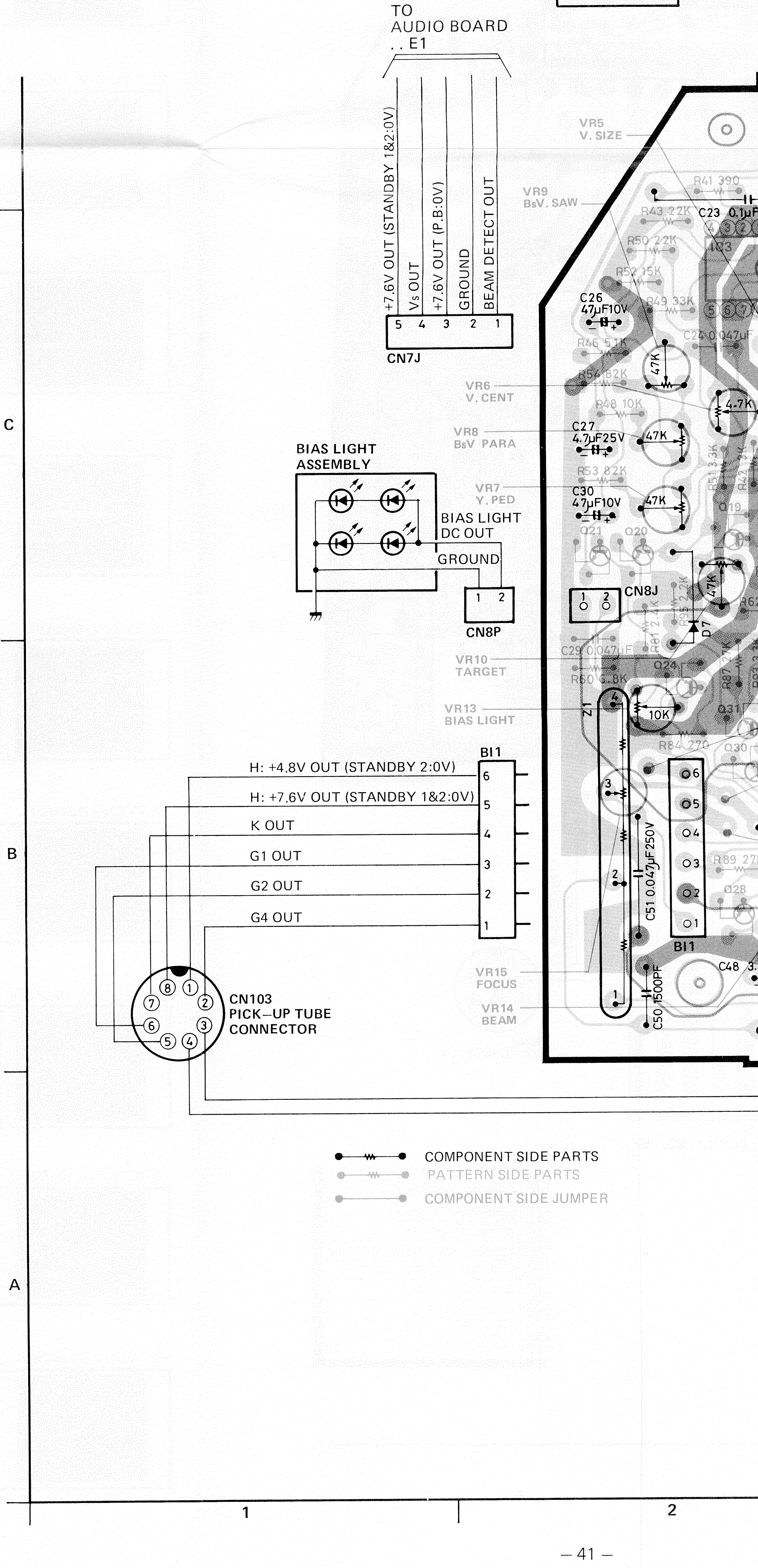

5
①
②
③
④
R1
R2
R3
12.6M
7.4M
VR15
0.9M
3.1M

AN2510S



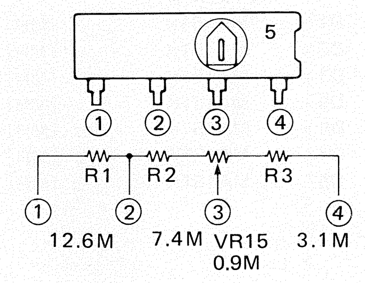
L101
DEFLECTION COIL
for PICK–UP TUBE


HORIZONTAL
H. DEF (–)
H. DEF (+)
THERMISTO
V. DEF (–)
V. DEF (+)
VERTICAL


TO
AUDIO BOARD
.. E1
+7.6V OUT (STANDBY 1&2:0V)
Vs OUT
+7.6V OUT (P.B:0V)
GROUND
BEAM DETECT OUT
5 4 3 2 1
CN7J
VR5
V. SIZE
VR9
BsV. SAW
VR6
V. CENT
VR8
BsV PARA
VR7
Y. PED
VR10
TARGET
VR13
BIAS LIGHT
VR15
FOCUS
VR14
BEAM
BIAS LIGHT
ASSEMBLY
BIAS LIGHT
DC OUT
GROUND
1 2
CN8P
CN8J
BI1
H: +4.8V OUT (STANDBY 2:0V)
H: +7.6V OUT (STANDBY 1&2:0V)
K OUT
G1 OUT
G2 OUT
G4 OUT
6
5
4
3
2
1
CN103
PICK–UP TUBE
CONNECTOR
R41 390
R43 22K
C23 0.1µF
R50 2.2K
IC3
R52 15K
C26
47µF10V
R49 33K
C24 0.047µF
R46 51K
R54 82K
47K
R48 10K
4.7K
C27
4.7µF25V
47K
R53 82K
R51 3.3K
C30
47µF10V
47K
Q19
Q21
Q20
47K
R55 2.2K
D7
C29 0.047µF
R81 2.4K
Q24
R87
R60 6.8K
10K
Q31
Z1
R84 270
Q30
C51 0.047µF250V
R89 27
Q28
BI1
C48
C50 1500PF
C
B
A
1
2
COMPONENT SIDE PARTS
PATTERN SIDE PARTS
COMPONENT SIDE JUMPER

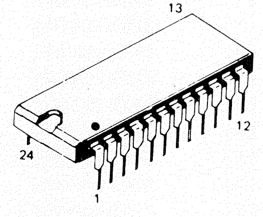
CONDUCTOR VIEW OF DEFLECTION BOARD (YFVKY4860P1A)

BLOCK RESISTOR
EVM71GA00114

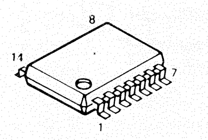


5
①
②
③
④
R1
R2
R3
①
②
③
④
12.6M
7.4M
VR15
0.9M
3.1M

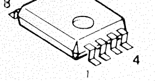
AN2510S



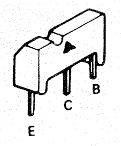
NJM2048MC



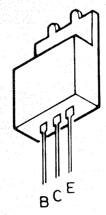
NJM3415M
NJM2903M



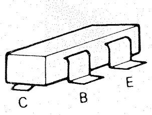
2SB793-QRS
2SD636-QRS
2SD973-QRS

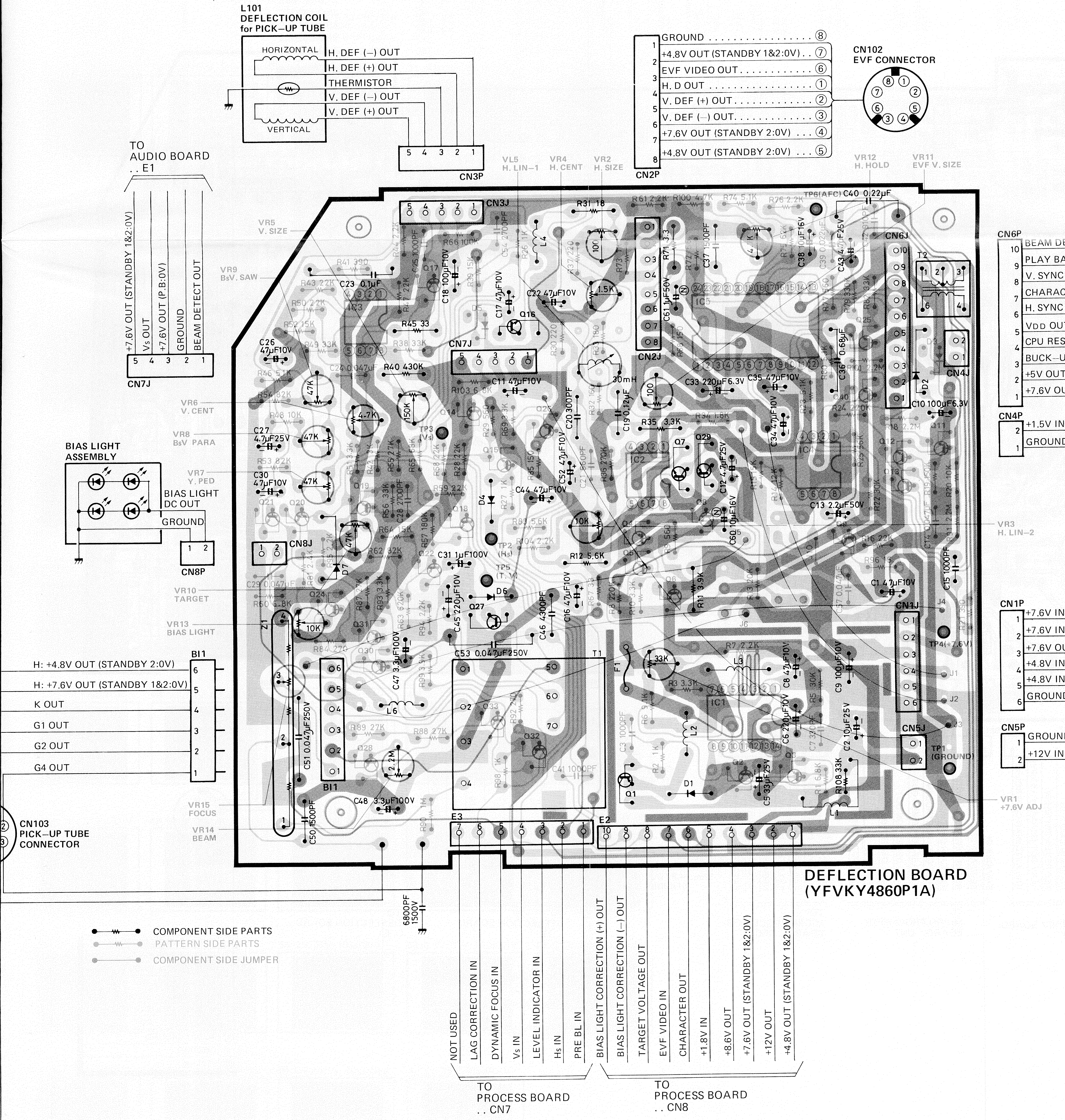


2SD1083
2SB837-CD



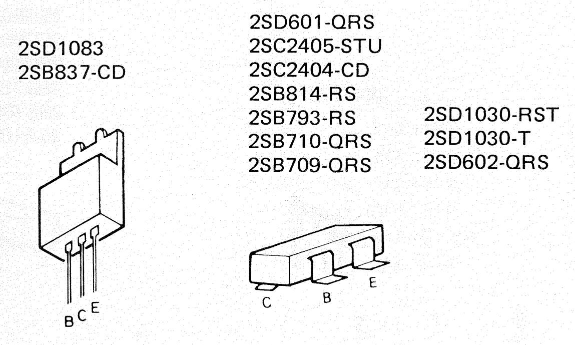
2SD601-QRS
2SC2405-STU
2SC2404-CD
2SB814-RS
2SB793-RS
2SB710-QRS
2SB709-QRS

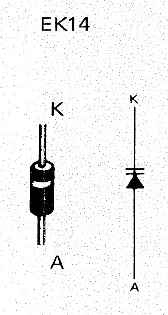


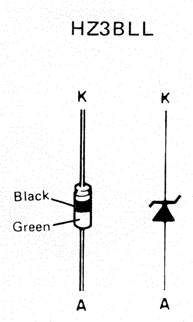


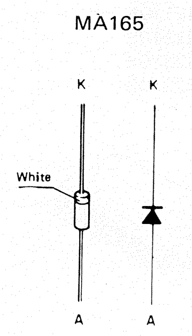
L101
DEFLECTION COIL
for PICK-UP TUBE
HORIZONTAL
H. DEF (–) OUT
H. DEF (+) OUT
THERMISTOR
V. DEF (–) OUT
V. DEF (+) OUT
VERTICAL
5 4 3 2 1
CN3P
GROUND ⑧
+4.8V OUT (STANDBY 1&2:0V) ⑦
EVF VIDEO OUT ⑥
H. D OUT ①
V. DEF (+) OUT ②
V. DEF (–) OUT ③
+7.6V OUT (STANDBY 2:0V) ④
+4.8V OUT (STANDBY 2:0V) ⑤
CN2P
CN102
EVF CONNECTOR
TO
AUDIO BOARD
..E1
+7.6V OUT (STANDBY 1&2:0V)
Vs OUT
+7.6V OUT (P.B:0V)
GROUND
BEAM DETECT OUT
5 4 3 2 1
CN7J
VL5
H. LIN–1
VR4
H. CENT
VR2
H. SIZE
VR12
H. HOLD
VR11
EVF V. SIZE
VR5
V. SIZE
VR9
BsV. SAW
VR6
V. CENT
VR8
BsV PARA
VR7
Y. PED
VR10
TARGET
VR13
BIAS LIGHT
VR15
FOCUS
VR14
BEAM
VR3
H. LIN–2
VR1
+7.6V ADJ
BIAS LIGHT
ASSEMBLY
BIAS LIGHT
DC OUT
GROUND
1 2
CN8P
CN8J
CN3J
CN7J
CN2J
CN6J
CN4J
CN1J
CN5J
T2
T1
IC1
IC2
IC3
IC4
IC5
TP1 (GROUND)
TP2 (Hs)
TP3 (Vs)
TP4 (+7.6V)
TP5 (T.V)
TP6 (AFC)
C40 0.22μF
R31 18
R61 2.2K
R100 4.7K
R74 5.1K
R76 2.2K
R41 390
R43 2.2K
C23 0.1μF
R50 2.2K
R52 15K
R49 33K
R45 33
R38 33K
R40 430K
R46 5.1K
C24 0.047μF
C26 47μF10V
C27 4.7μF25V
C30 47μF10V
R53 8.2K
R54 8.2K
R48 10K
R66 100K
C18 100μF10V
C17 47μF10V
C22 47μF10V
C11 47μF10V
C20 300PF
C19 0.12μF
R35 3.3K
R34 1.8K
C33 220μF6.3V
C35 47μF10V
C36 0.68μF
C38 10μF16V
C39 0.022μF
C43 4.7μF25V
C37 1500PF
C61 1μF50V
C10 100μF6.3V
C13 2.2μF50V
C12 4.7μF25V
C60 10μF16V
C52 47μF10V
C44 47μF10V
C31 1μF100V
C45 220μF10V
C46 4300PF
C16 47μF10V
C47 3.3μF100V
C53 0.047μF250V
C51 0.047μF250V
C50 1500PF
C48 3.3μF100V
C41 1000PF
C29 0.047μF
C15 1000PF
C1 4.7μF10V
C8 47μF10V
C9 100μF10V
C6 220μF10V
C2 10μF25V
C5 33μF25V
C3 1000PF
C7 3200PF
R12 5.6K
R11 3.9K
R7 2.2K
R3 3.3K
R5 30K
R108 33K
R89 27K
R88 27K
R84 270
R60 6.8K
R62 82K
R64 15K
R57 180K
R59 2.2K
R56 33K
R55 27K
R83 5.6K
R104 2.2K
R22 30K
R16 22K
R96 1.5K
30mH
10K
33K
47K
4.7K
150K
1.5K
2.2M
L1
L2
L3
L4
L6
D1
D2
D4
D6
D7
Q1
Q7
Q11
Q12
Q14
Q15
Q16
Q17
Q18
Q19
Q20
Q21
Q22
Q23
Q25
Q27
Q28
Q29
Q30
Q31
Q32
Q33
F1
Z1
J1
J2
J3
J4
J6
BI1
H: +4.8V OUT (STANDBY 2:0V)
H: +7.6V OUT (STANDBY 1&2:0V)
K OUT
G1 OUT
G2 OUT
G4 OUT
6 5 4 3 2 1
CN103
PICK-UP TUBE
CONNECTOR
6800PF
1500V
CN6P
BEAM DE
PLAY BA
V. SYNC
CHARAC
H. SYNC
VDD OU
CPU RES
BUCK–U
+5V OUT
+7.6V OU
CN4P
+1.5V IN
GROUND
CN1P
+7.6V IN
+7.6V IN
+7.6V OU
+4.8V IN
+4.8V IN
GROUND
CN5P
GROUND
+12V IN
E3
7 6 5 4 3 2 1
E2
10 9 8 7 6 5 4 3 2 1
DEFLECTION BOARD
(YFVKY4860P1A)
NOT USED
LAG CORRECTION IN
DYNAMIC FOCUS IN
Vs IN
LEVEL INDICATOR IN
Hs IN
PRE BL IN
BIAS LIGHT CORRECTION (+) OUT
BIAS LIGHT CORRECTION (–) OUT
TARGET VOLTAGE OUT
EVF VIDEO IN
CHARACTER OUT
+1.8V IN
+8.6V OUT
+7.6V OUT (STANDBY 1&2:0V)
+12V OUT
+4.8V OUT (STANDBY 1&2:0V)
TO
PROCESS BOARD
..CN7
TO
PROCESS BOARD
..CN8
COMPONENT SIDE PARTS
PATTERN SIDE PARTS
COMPONENT SIDE JUMPER
1
2
3
4

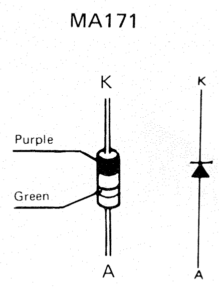
Y4860P1A)

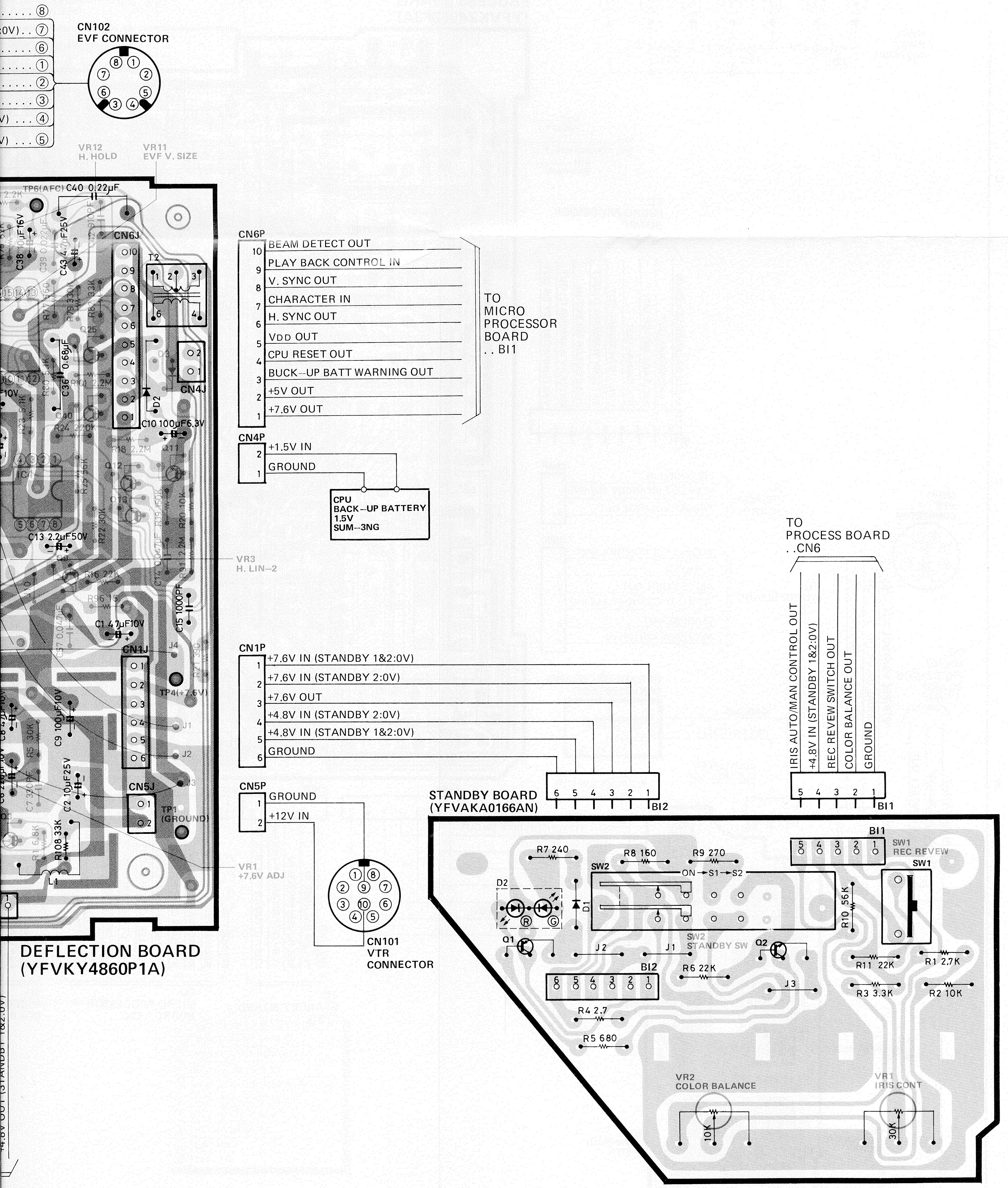

2SD1083
2SB837-CD
2SD601-QRS
2SC2405-STU
2SC2404-CD
2SB814-RS
2SB793-RS
2SB710-QRS
2SB709-QRS
2SD1030-RST
2SD1030-T
2SD602-QRS
B C E
C B E


EK14
K
K
A
A


HZ3BLL
K
K
Black
Green
A
A

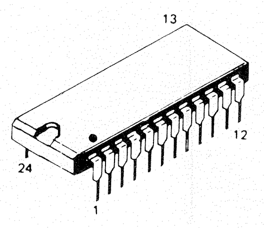

MA165
K
K
White
A
A


MA171
K
K
Purple
Green
A
A

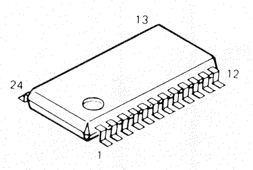

......⑧
0V)..⑦
......⑥
......①
......②
......③
V)...④
V)...⑤
CN102
EVF CONNECTOR
VR12
H. HOLD
VR11
EVF V. SIZE
TP6(AFC) C40 0.22µF
CN6J
T2
D3
D2
CN4J
C10 100µF6.3V
C13 2.2µF50V
VR3
H. LIN–2
C15 1000PF
C1 47µF10V
CN1J
J4
TP4(+7.6V)
J1
J2
J3
C9 100µF10V
C2 10µF25V
CN5J
TP1 (GROUND)
R108 33K
L1
VR1
+7.6V ADJ
DEFLECTION BOARD
(YFVKY4860P1A)
CN6P
10 BEAM DETECT OUT
9 PLAY BACK CONTROL IN
8 V. SYNC OUT
7 CHARACTER IN
6 H. SYNC OUT
5 VDD OUT
4 CPU RESET OUT
3 BUCK–UP BATT WARNING OUT
2 +5V OUT
1 +7.6V OUT
TO MICRO PROCESSOR BOARD ..BI1
CN4P
2 +1.5V IN
1 GROUND
CPU BACK–UP BATTERY 1.5V SUM–3NG
CN1P
1 +7.6V IN (STANDBY 1&2:0V)
2 +7.6V IN (STANDBY 2:0V)
3 +7.6V OUT
4 +4.8V IN (STANDBY 2:0V)
5 +4.8V IN (STANDBY 1&2:0V)
6 GROUND
CN5P
1 GROUND
2 +12V IN
CN101
VTR
CONNECTOR
+4.8V OUT (STANDBY 1&2:0V)
TO PROCESS BOARD ..CN6
IRIS AUTO/MAN CONTROL OUT
+4.8V IN (STANDBY 1&2:0V)
REC REVEW SWITCH OUT
COLOR BALANCE OUT
GROUND
5 4 3 2 1 BI1
STANDBY BOARD
(YFVAKA0166AN)
6 5 4 3 2 1 BI2
BI1
SW1 REC REVEW
SW1
R7 240
R8 160
R9 270
SW2
ON→S1→S2
D2
D1
R G
R10 56K
Q1
J2
J1
SW2 STANDBY SW
Q2
R11 22K
R1 2.7K
BI2
R6 22K
J3
R3 3.3K
R2 10K
R4 2.7
R5 680
VR2
COLOR BALANCE
VR1
IRIS CONT
10K
30K
4
5
6

CONDUCT

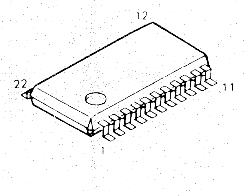
YFS4158KIT
(IC6)



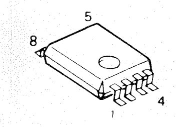
AN2560S
AN2110S
AN2310S
AN2320S
AN2210S



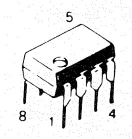
AN2410S
MN6064



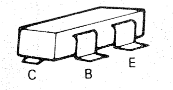
AN6914S
NJM3414M

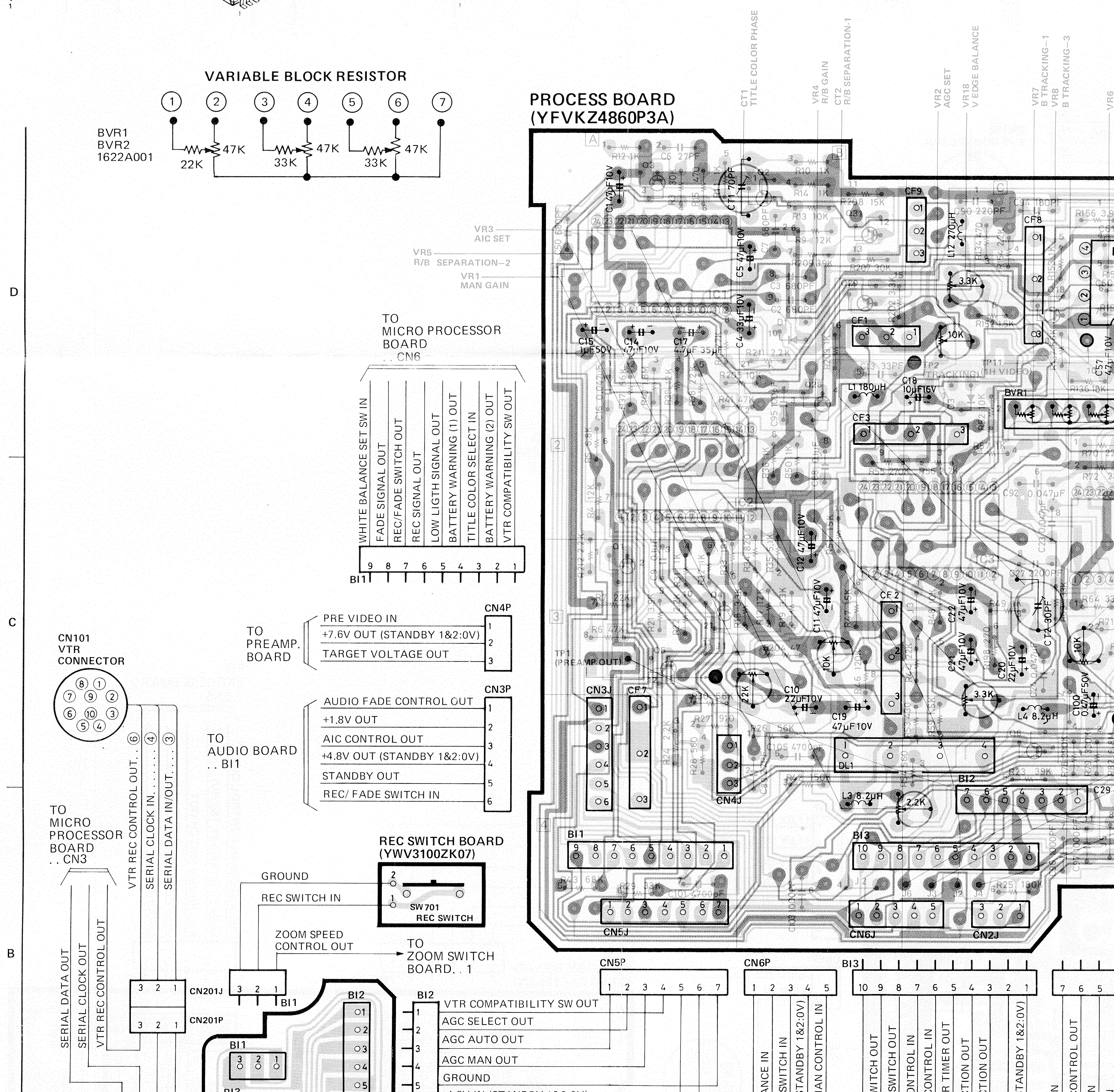


MN8029



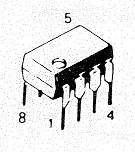
2SD602–QRS
2SD601-QRS
2SC2404-CD
2SB710-QRS
2SB709-QRS
2SA1034-ST



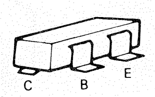

VARIABLE BLOCK RESISTOR
BVR1
BVR2
1622A001
22K
47K
33K
47K
33K
47K
PROCESS BOARD
(YFVKZ4860P3A)
CT1 TITLE COLOR PHASE
VR4 R/B GAIN
CT2 R/B SEPARATION-1
VR2 AGC SET
VR18 V EDGE BALANCE
VR7 B TRACKING-1
VR8 B TRACKING-3
VR3 AIC SET
VR5 R/B SEPARATION-2
VR1 MAN GAIN
TO MICRO PROCESSOR BOARD . . CN6
WHITE BALANCE SET SW IN
FADE SIGNAL OUT
REC/FADE SWITCH OUT
REC SIGNAL OUT
LOW LIGTH SIGNAL OUT
BATTERY WARNING (1) OUT
TITLE COLOR SELECT IN
BATTERY WARNING (2) OUT
VTR COMPATIBILITY SW OUT
BI1
CN4P
TO PREAMP. BOARD
PRE VIDEO IN
+7.6V OUT (STANDBY 1&2:0V)
TARGET VOLTAGE OUT
CN3P
TO AUDIO BOARD . . BI1
AUDIO FADE CONTROL OUT
+1.8V OUT
AIC CONTROL OUT
+4.8V OUT (STANDBY 1&2:0V)
STANDBY OUT
REC/ FADE SWITCH IN
CN101 VTR CONNECTOR
VTR REC CONTROL OUT. . . . ⑥
SERIAL CLOCK IN. . . . . . ④
SERIAL DATA IN/OUT. . . . ③
TO MICRO PROCESSOR BOARD . . CN3
SERIAL DATA OUT
SERIAL CLOCK OUT
VTR REC CONTROL OUT
CN201J
CN201P
BI3
REC SWITCH BOARD (YWV3100ZK07)
GROUND
REC SWITCH IN
SW701 REC SWITCH
ZOOM SPEED CONTROL OUT
TO ZOOM SWITCH BOARD. . 1
BI2
VTR COMPATIBILITY SW OUT
AGC SELECT OUT
AGC AUTO OUT
AGC MAN OUT
GROUND
+4.8V IN (STANDBY 1&2:0V)
REC/FADE SWITCH OUT
SW1 VTR COMPATIBILITY SWITCH
RUN
SW2 FADE SWITCH
R2 910
SW4 AGC : ON/OFF SWITCH
ON
OFF
R1 4.3K
SW3 ZOOM SPEED SWITCH
SLOW
FAST
FADE/AGC SWITCH BOARD (YFVKZ3230P8A)
CN5P
CN6P
GROUND
COLOR BALANCE IN
REC REVEW SWITCH IN
+4.8V OUT (STANDBY 1&2:0V)
IRIS AUTO/MAN CONTROL IN
TO STANDBY BOARD . . BI1
STANDBY IN
REC/FADE SWITCH OUT
REC REVEW SWITCH IN
RED GAIN CONTROL IN
BLUE GAIN CONTROL IN
V. PULSE FOR TIMER OUT
B–YL DETECTION OUT
R–YL DETECTION OUT
+1.8V OUT
+4.8V OUT (STANDBY 1&2:0V)
TO MICRO PROCESSOR BOARD. . CN7
REC RESET IN
PLAYBACK CONTROL OUT
EXT VIDEO IN
EXT NEGA IN
TO MICRO PR
BOARD. .
CN3J
CF7
CN4J
CN5J
CN6J
CN2J
BI1
BI2
BI3
DL1
BVR1
TP1 (PREAMP OUT)
TP2 (TRACKING)
TP11 (H VIDEO)
CF1
CF2
CF3
CF8
CF9
IC1
IC3
D
C
B
A
1
2
3

CONDUCTOR VIEW OF PROCESS BOARD (YFVKZ4860P3A)

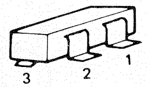
MN8029



2SD602–QRS
2SD601-QRS
2SC2404-CD
2SB710-QRS
2SB709-QRS
2SA1034-ST

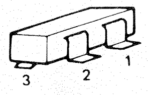


MA151K



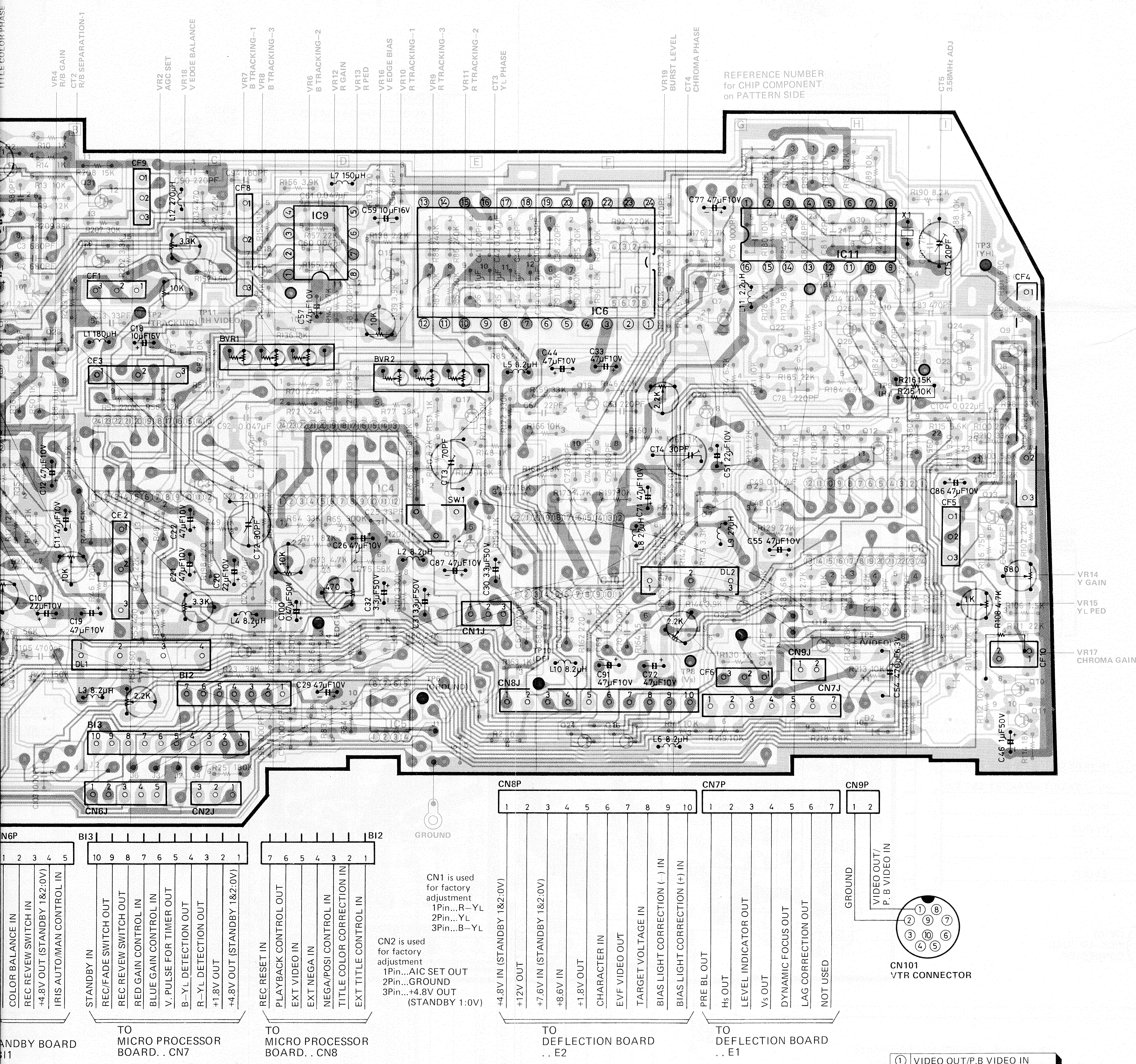
1 : NC
2 : Anode
3 : Cathode

MA151WA



1 : Cathode
2 : Cathode
3 : Anode

D1	MA151K	[MH]	D3
D2	MA151K	[MH]	B6
D3	MA151K	[MH]	D3
D5	MA151K	[MH]	C4
D6	MA151K	[MH]	C6
D7	MA151WA	[MN]	C5
D8	MA151K	[MH]	D5


TITLE COLOR PHASE
VR4 R/B GAIN
CT2 R/B SEPARATION-1
VR2 AGC SET
VR18 V EDGE BALANCE
VR7 B TRACKING–1
VR8 B TRACKING–3
VR6 B TRACKING–2
VR12 R GAIN
VR13 R PED
VR16 V EDGE BIAS
VR10 R TRACKING–1
VR9 R TRACKING–3
VR11 R TRACKING–2
CT3 YL PHASE
VR19 BURST LEVEL
CT4 CHROMA PHASE
REFERENCE NUMBER for CHIP COMPONENT on PATTERN SIDE
CT5 3.58MHz ADJ
VR14 Y GAIN
VR15 YL PED
VR17 CHROMA GAIN
IC9
IC6
IC11
IC4
IC7
BVR1
BVR2
CF1
CF2
CF3
CF4
CF5
CF6
CF8
CF9
CF10
DL1
DL2
SW1
X1
TP1
TP2 TRACKING
TP3 (YH)
TP5 (VIDEO)
TP6 (GROUND)
TP8 (Vs)
TP11 (H VIDEO)
CN1J
CN2J
CN6J
CN7J
CN8J
CN9J
BI2
BI3
GROUND
CN6P
1 2 3 4 5
COLOR BALANCE IN
REC REVEW SWITCH IN
+4.8V OUT (STANDBY 1&2:0V)
IRIS AUTO/MAN CONTROL IN
ANDBY BOARD
I1
BI3
10 9 8 7 6 5 4 3 2 1
STANDBY IN
REC/FADE SWITCH OUT
REC REVEW SWITCH OUT
RED GAIN CONTROL IN
BLUE GAIN CONTROL IN
V. PULSE FOR TIMER OUT
B–YL DETECTION OUT
R–YL DETECTION OUT
+1.8V OUT
+4.8V OUT (STANDBY 1&2:0V)
TO MICRO PROCESSOR BOARD. . CN7
BI2
7 6 5 4 3 2 1
REC RESET IN
PLAYBACK CONTROL OUT
EXT VIDEO IN
EXT NEGA IN
NEGA/POSI CONTROL IN
TITLE COLOR CORRECTION IN
EXT TITLE CONTROL IN
TO MICRO PROCESSOR BOARD. . CN8
CN8P
1 2 3 4 5 6 7 8 9 10
+4.8V IN (STANDBY 1&2:0V)
+12V OUT
+7.6V IN (STANDBY 1&2:0V)
+8.6V IN
+1.8V OUT
CHARACTER IN
EVF VIDEO OUT
TARGET VOLTAGE IN
BIAS LIGHT CORRECTION (–) IN
BIAS LIGHT CORRECTION (+) IN
TO DEFLECTION BOARD . . E2
CN7P
1 2 3 4 5 6 7
PRE BL OUT
Hs OUT
LEVEL INDICATOR OUT
Vs OUT
DYNAMIC FOCUS OUT
LAG CORRECTION OUT
NOT USED
TO DEFLECTION BOARD . . E1
CN9P
1 2
GROUND
VIDEO OUT/ P. B VIDEO IN
CN101 VTR CONNECTOR

CN1 is used
for factory
adjustment
1Pin...R–YL
2Pin...YL
3Pin...B–YL

CN2 is used
for factory
adjustment
1Pin...AIC SET OUT
2Pin...GROUND
3Pin...+4.8V OUT
(STANDBY 1:0V)

—w— COMPONENT SIDE PARTS

—w— PATTERN SIDE PARTS

—— COMPONENT SIDE JUMPER

①	VIDEO OUT/P.B VIDEO IN
②	GROUND FOR PIN ①
③	SERIAL DATA IN/OUT
④	SERIAL CLOCK IN
⑤	AUDIO CH2(R)/STANDBY OUT
⑥	VTR REC CONTROL OUT
⑦	AUDIO CH1(L) OUT
⑧	AUDIO GROUND
⑨	GROUND
⑩	+12V IN

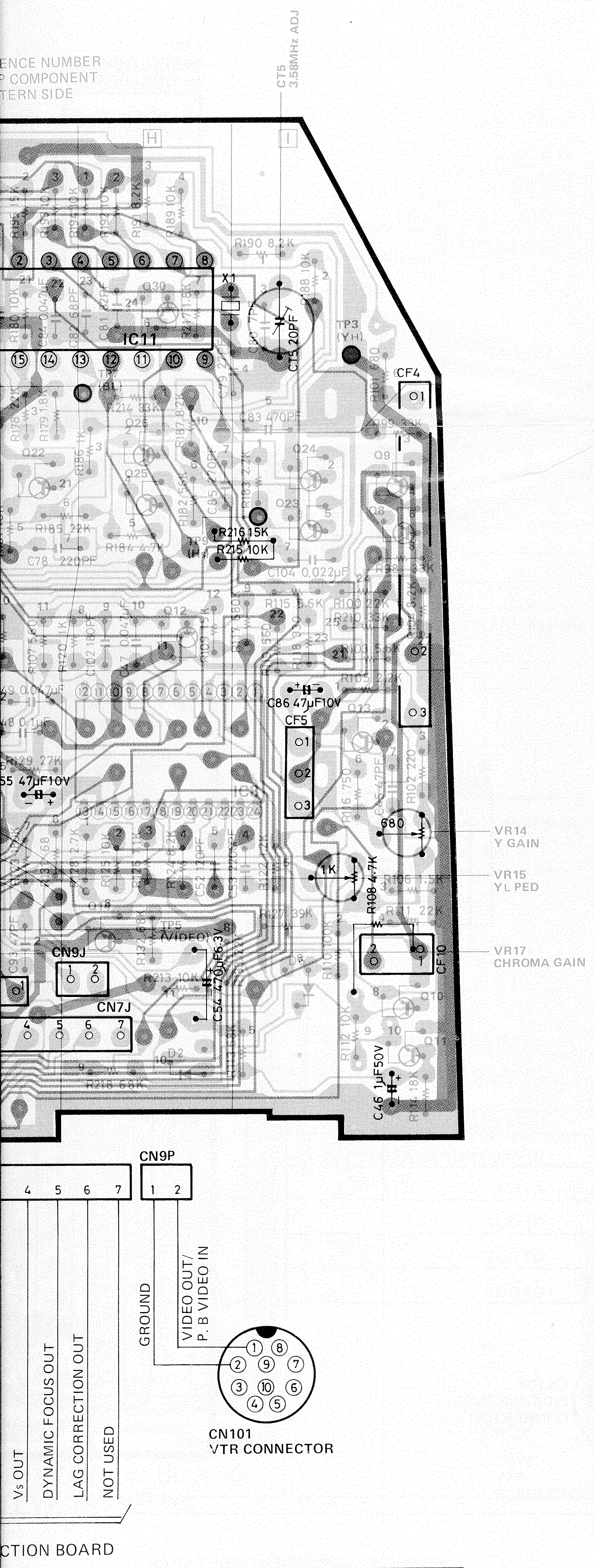
FVKZ4860P3A)

D1	MA151K	[MH]	D3
D2	MA151K	[MH]	B6
D3	MA151K	[MH]	D3
D5	MA151K	[MH]	C4
D6	MA151K	[MH]	C6
D7	MA151WA	[MN]	C5
D8	MA151K	[MH]	D5

PROCESS BOARD

IC1	AN2560S	D2
IC2	AN2110S	C2
IC3	AN2310S	C3
IC4	AN2320S	C4
IC5	AN6914S	B4
IC6	YFS4158KIT	D5
IC7	NJM3414M	D5
IC8	AN2210S	C6
IC9	MN8029	D4
IC10	AN2410S	C5
IC11	MN6064	D6

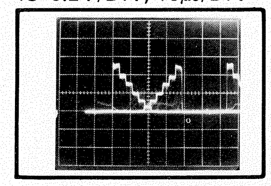
Q1	2SB709-QRS	[A]	C2	Q17	2SD601-QRS	[Y]	C4
Q2	2SC2404-CD	[U]	D3	Q18	2SD601-QRS	[Y]	D4
Q3	2SD601-QRS	[Y]	D2	Q19	2SC2404-CD	[U]	C5
Q4	2SD601-QRS	[Y]	C3	Q20	2SC2404-CD	[U]	C5
Q5	2SD601-QRS	[Y]	C2	Q21	2SD601-QRS	[Y]	B5
Q6	2SD601-QRS	[Y]	C4	Q22	2SB709-QRS	[A]	D5
Q7	2SD602-QRS	[W]	D5	Q23	2SD601-QRS	[Y]	D6
Q8	2SB709-QRS	[A]	D6	Q24	2SB710-QRS	[C]	D6
Q9	2SB709-QRS	[A]	D6	Q25	2SB709-QRS	[A]	D6
Q10	2SB709-QRS	[A]	B6	Q26	2SD601-QRS	[Y]	D6
Q11	2SD601-QRS	[Y]	B6	Q27	2SD601-QRS	[Y]	C4
Q12	2SB709-QRS	[A]	C6	Q28	2SD601-QRS	[Y]	D3
Q13	2SD601-QRS	[Y]	C6	Q29	2SA1034-ST		D3
Q14	2SD601-QRS	[Y]	C6	Q30	2SD601-QRS	[Y]	D6
Q15	2SB709-QRS	[A]	D4	Q31	2SB709-QRS	[A]	D3
Q16	2SD601-QRS	[Y]	B5	Q32	2SD601-QRS	[Y]	C5


ENCE NUMBER
P COMPONENT
TERN SIDE
CT5 3.58MHz ADJ
H
I
IC11
X1
TP3 (YH)
CF4
C15 20PF
R190 8.2K
C83 470PF
R216 15K
R215 10K
C78 220PF
C104 0.022µF
R115 5.6K
C86 47µF10V
CF5
55 47µF10V
680
1K
R108 4.7K
VR14 Y GAIN
VR15 YL PED
VR17 CHROMA GAIN
TP5 (VIDEO)
C54 470µF6.3V
R213 10K
CN9J
CN7J
CF10
C46 1µF50V
CN9P
4 5 6 7
1 2
GROUND
VIDEO OUT/ P. B VIDEO IN
Vs OUT
DYNAMIC FOCUS OUT
LAG CORRECTION OUT
NOT USED
CN101 VTR CONNECTOR
CTION BOARD

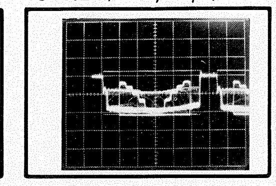
①	VIDEO OUT/P.B VIDEO IN
②	GROUND FOR PIN ①
③	SERIAL DATA IN/OUT
④	SERIAL CLOCK IN
⑤	AUDIO CH2(R)/STANDBY OUT
⑥	VTR REC CONTROL OUT
⑦	AUDIO CH1(L) OUT
⑧	AUDIO GROUND
⑨	GROUND
⑩	+12V IN

6

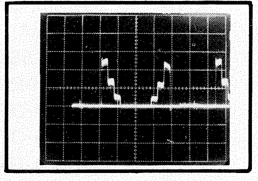
18 0.2V/DIV, 10µs/DIV



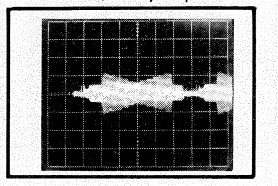
19 0.2V/DIV, 10µs/DIV



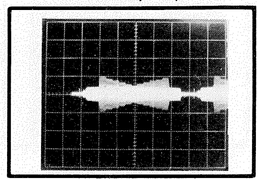
20 0.1V/DIV, 10µs/DIV



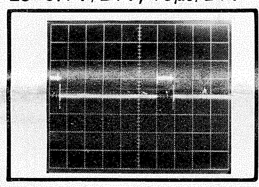
21 50mV/DIV, 10µs/DIV



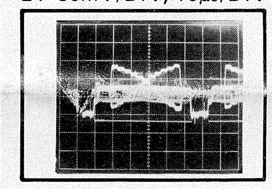
22 0.1V/DIV, 10µs/DIV



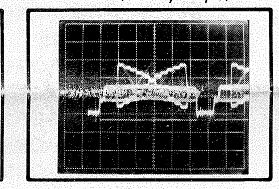
23 0.1V/DIV, 10µs/DIV



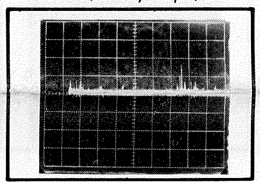
24 50mV/DIV, 10µs/DIV



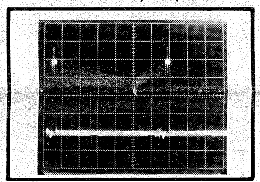
25 50mV/DIV, 10µs/DIV



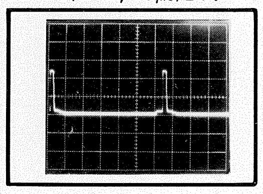
26 0.1V/DIV, 10µs/DIV



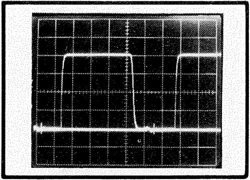
27 0.1V/DIV, 10µs/DIV



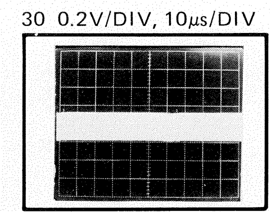
28 2V/DIV, 10µs/DIV



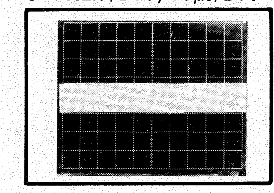
29 0.2V/DIV, 10µs/DIV



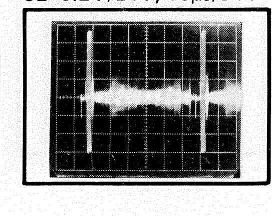
30 0.2V/DIV, 10µs/DIV



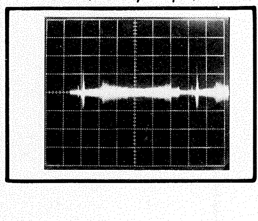
31 0.2V/DIV, 10µs/DIV



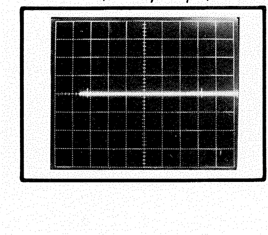
32 0.2V/DIV, 10µs/DIV



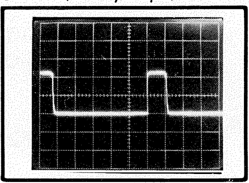
33 0.2V/DIV, 10µs/DIV



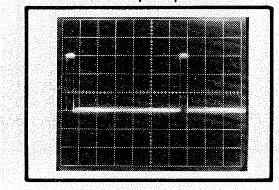
34 0.2V/DIV, 10µs/DIV



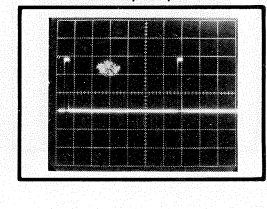
35 1V/DIV, 10µs/DIV



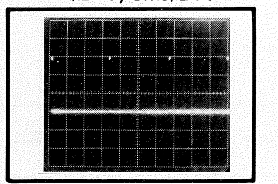
36 2V/DIV, 10µs/DIV



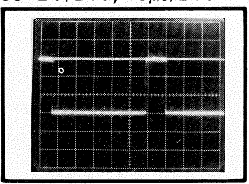
37 2V/DIV, 10µs/DIV



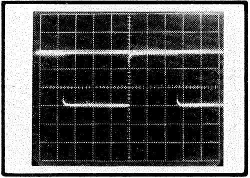
38 2V/DIV, 5ms/DIV



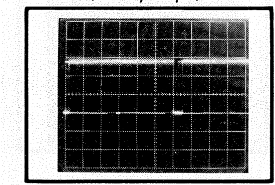
39 2V/DIV, 10µs/DIV



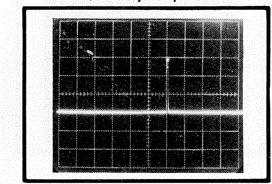
40 2V/DIV, 10µs/DIV



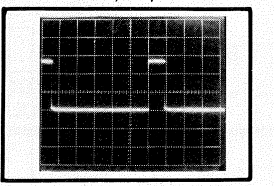
41 2V/DIV, 10µs/DIV



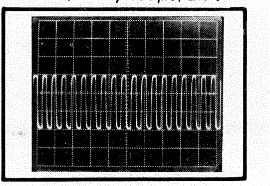
42 2V/DIV, 10µs/DIV



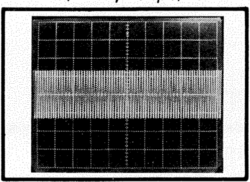
43 2V/DIV, 10µs/DIV



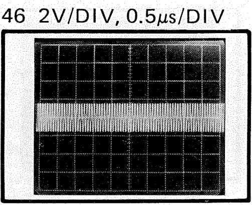
44 2V/DIV, 0.5µs/DIV



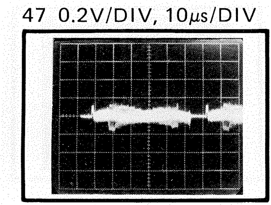
45 2V/DIV, 0.5µs/DIV



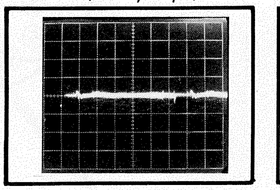
46 2V/DIV, 0.5µs/DIV



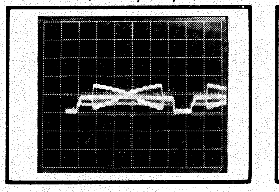
47 0.2V/DIV, 10µs/DIV



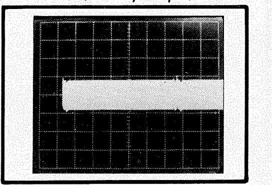
48 0.2V/DIV, 10µs/DIV



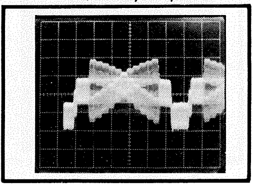
49 0.1V/DIV, 10µs/DIV



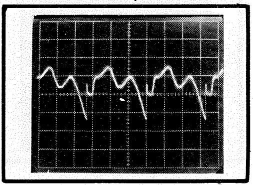
50 0.5V/DIV, 10µs/DIV



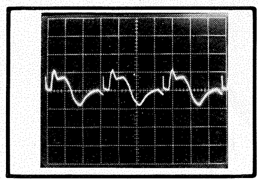
51 0.2V/DIV, 10µs/DIV



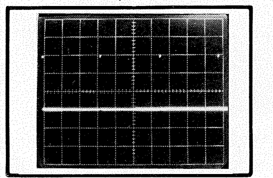
52 0.2V/DIV, 5ms/DIV



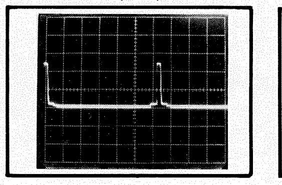
53 0.2V/DIV, 5ms/DIV



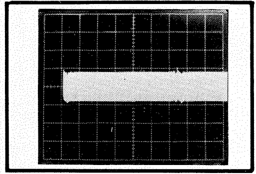
54 2V/DIV, 5ms/DIV



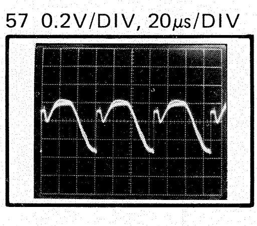
55 2V/DIV, 10µs/DIV



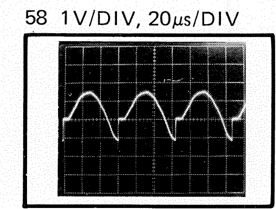
56 0.5V/DIV, 10µs/DIV



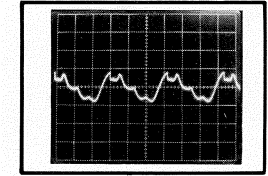
57 0.2V/DIV, 20µs/DIV



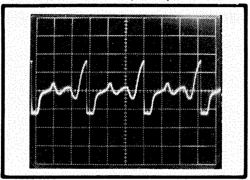
58 1V/DIV, 20µs/DIV



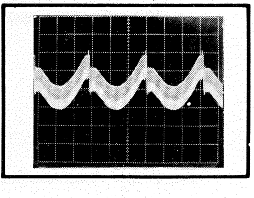
59 0.5V/DIV, 20µs/DIV



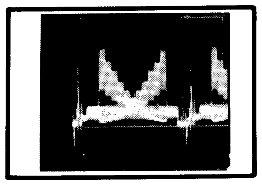
60 0.5V/DIV, 20µs/DIV



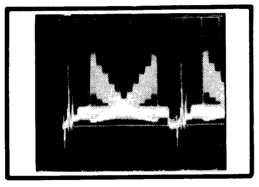
61 2V/DIV, 20µs/DIV



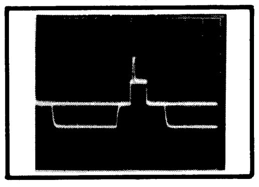
1 0.2V/DIV, 10µs/DIV



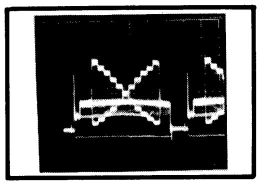
2 0.2V/DIV, 10µs/DIV



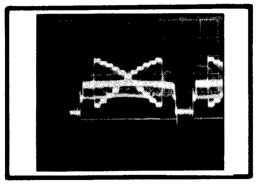
3 1V/DIV, 10µs/DIV



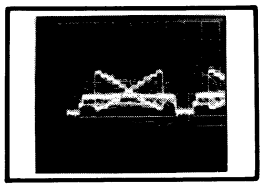
4 0.1V/DIV, 10µs/DIV



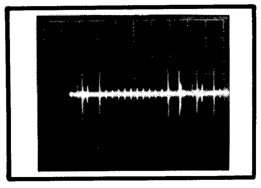
5 0.1V/DIV, 10µs/DIV



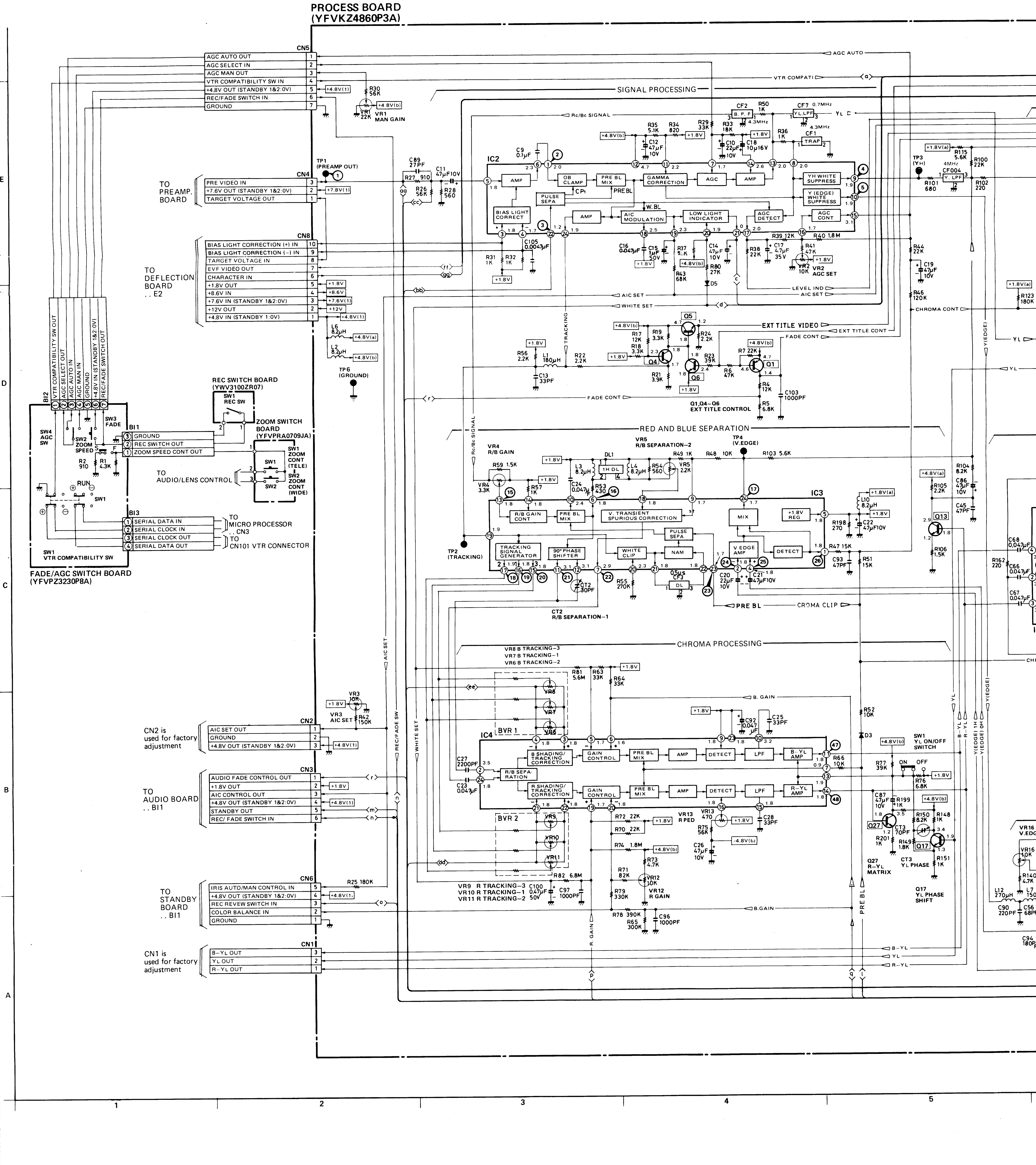
6 50mV/DIV, 10µs/DIV



7 0.1V/DIV, 10µs/DIV

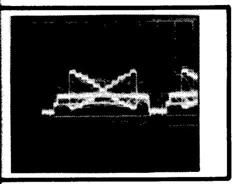


8 0

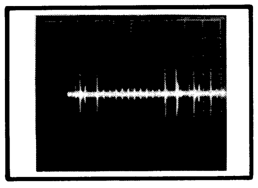


SCHEMATIC DIAGRAM OF PROCESS BOARD (YFVKZ4860P3A)

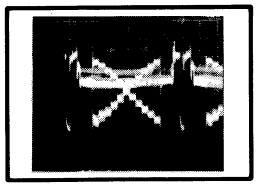
50mV/DIV, 10μs/DIV



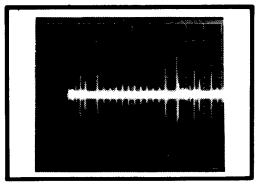
7 0.1V/DIV, 10μs/DIV



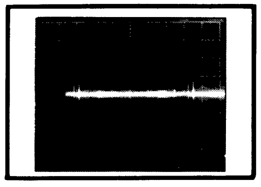
8 0.2V/DIV, 10μs/DIV



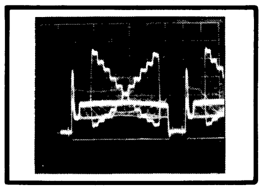
9 0.2V/DIV, 10μs/DIV



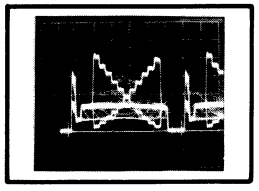
10 0.1V/DIV, 10μs/DIV



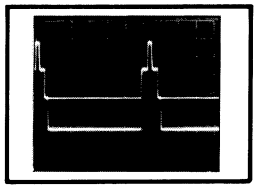
11 0.1V/DIV, 10μs/DIV



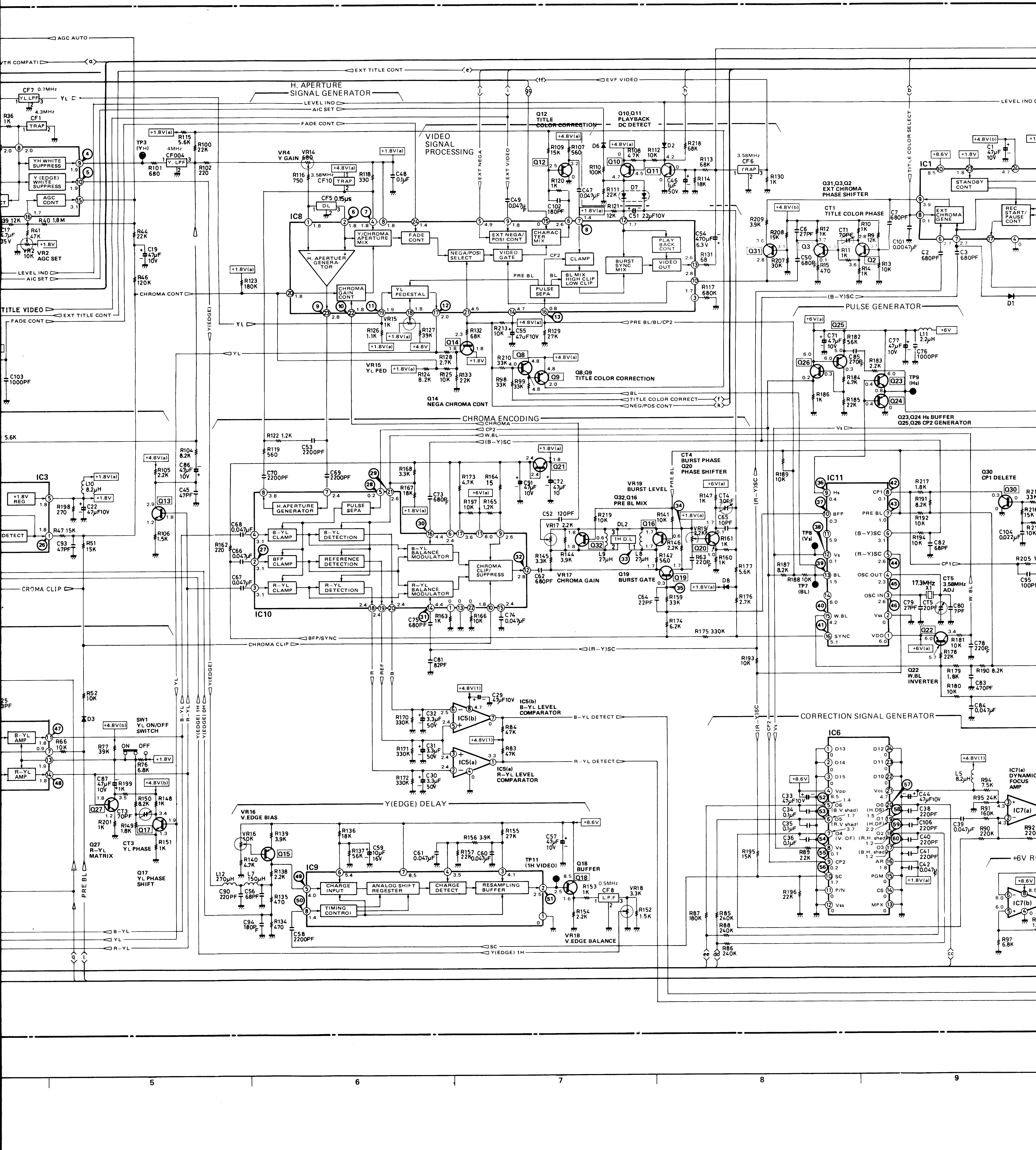
12 0.1V/DIV, 10μs/DIV



13 1V/DIV, 10μs/DIV

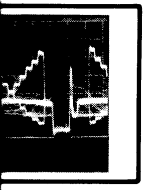


14 0.2V/

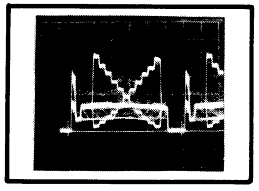


Z4860P3A)

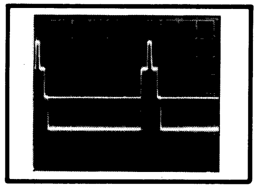
V, 10μs/DIV



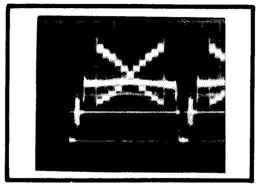
12 0.1V/DIV, 10μs/DIV



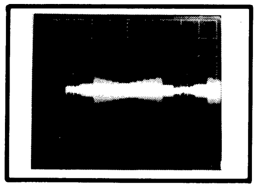
13 1V/DIV, 10μs/DIV



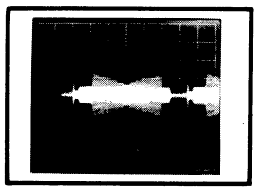
14 0.2V/DIV, 10μs/DIV



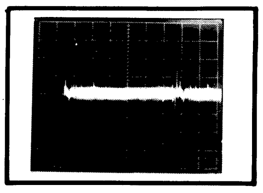
15 20V/DIV, 10μs/DIV

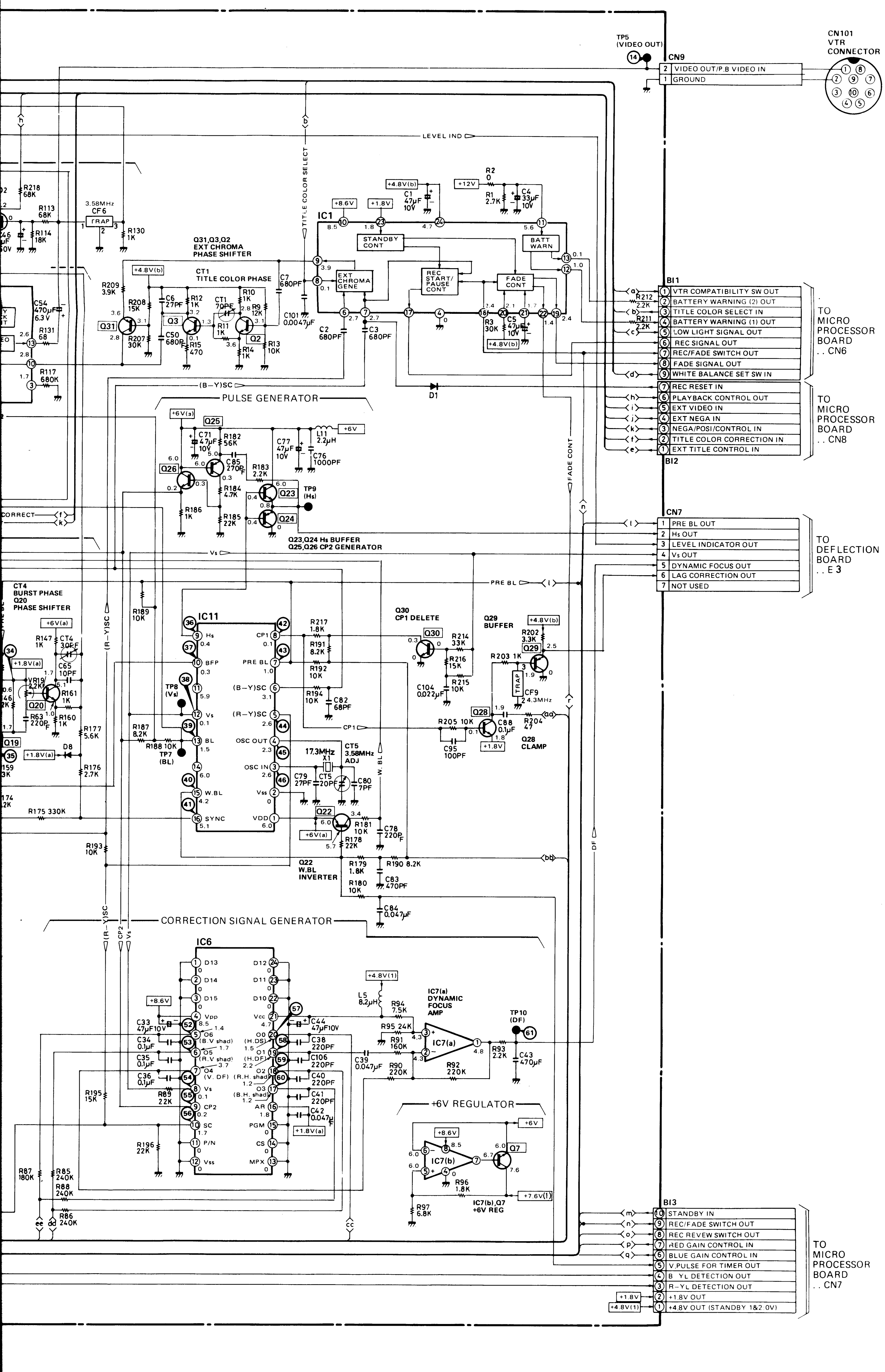


16 0.2V/DIV, 10μs/DIV



17 0.1V/DIV, 10μs/DIV

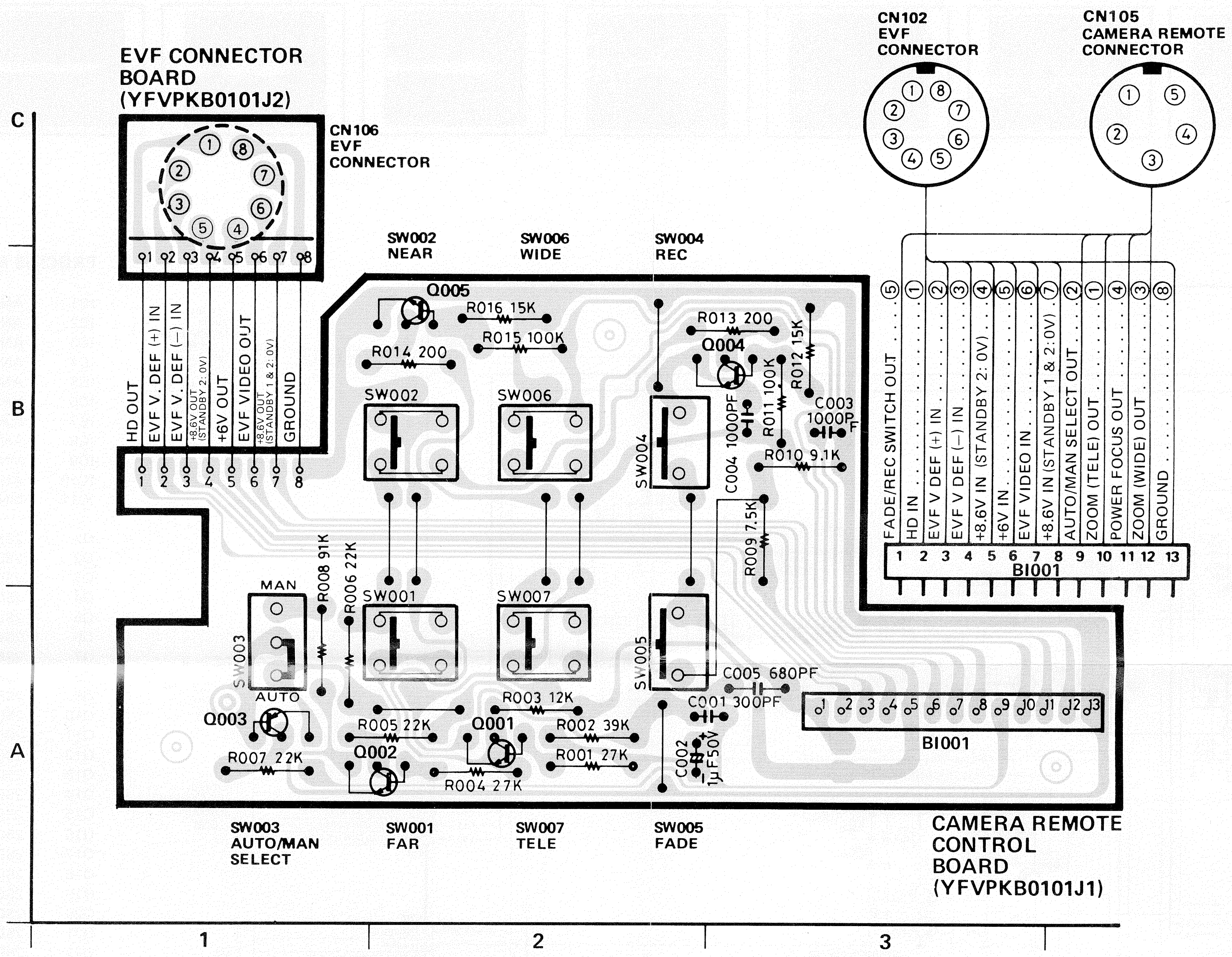




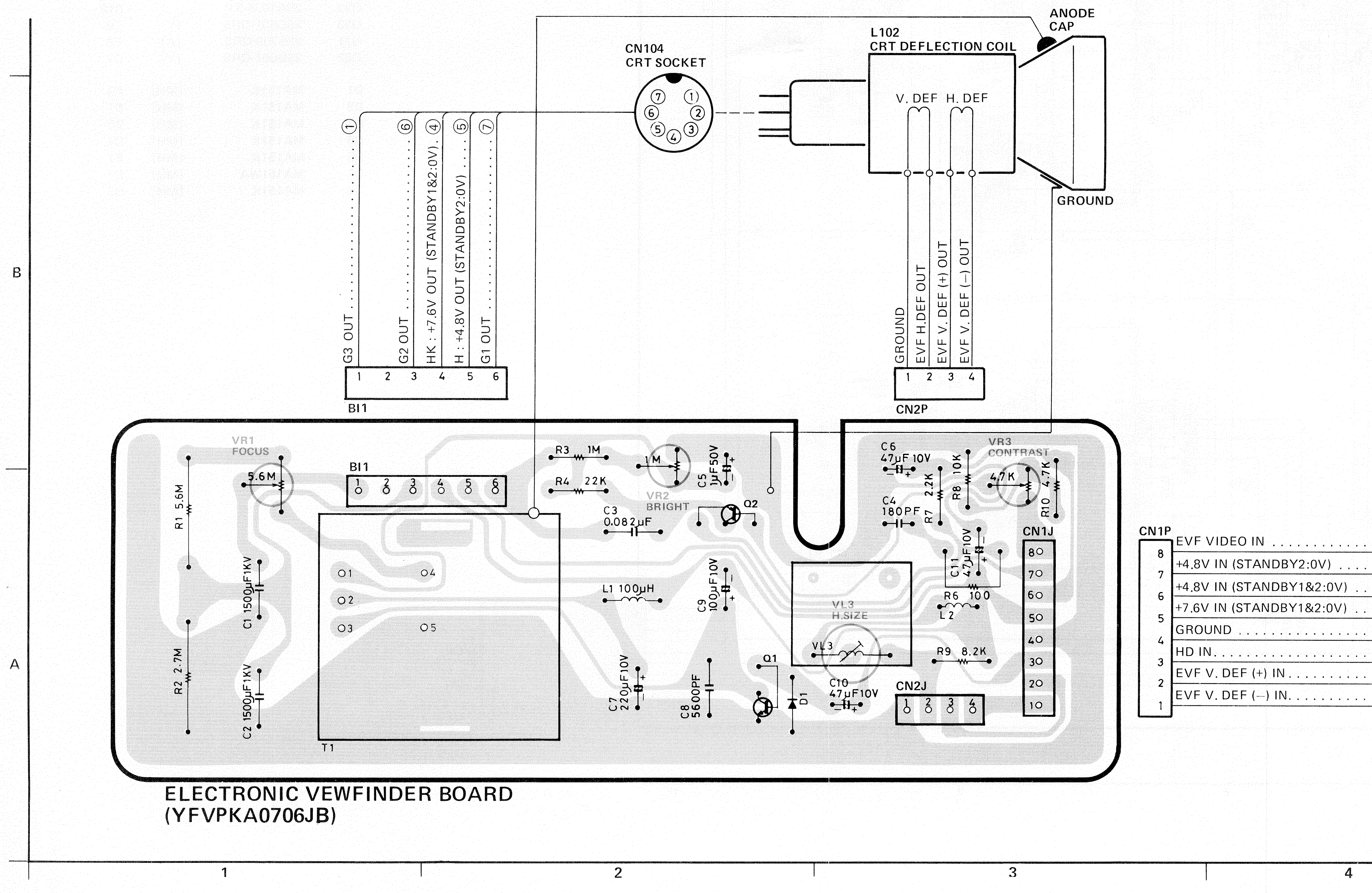
PROCESS BOARD

IC1	AN2560S		F9
IC2	AN2110S		E3
IC3	AN2310S		C4
IC4	AN2320S		B3
IC5	AN6914S		B7
IC6	YFS4158KIT		B8
IC7	NJM3414M		A9,B9
IC8	AN2210S		D6
IC9	MN8029		B6
IC10	AN2410S		C6
IC11	MN6064		C8
Q1	2SB709-QRS	[A]	D4
Q2	2SC2404-CD	[U]	E8
Q3	2SD601-QRS	[Y]	E8
Q4	2SD601-QRS	[Y]	D4
Q5	2SD601-QRS	[Y]	D4
Q6	2SD601-QRS	[Y]	D4
Q7	2SD602-QRS	[W]	A10
Q8	2SB709-QRS	[A]	D7
Q9	2SB709-QRS	[A]	D7
Q10	2SB709-QRS	[A]	E7
Q11	2SD601-QRS	[Y]	E7
Q12	2SB709-QRS	[A]	E6
Q13	2SD601-QRS	[Y]	C5
Q14	2SD601-QRS	[Y]	D7
Q15	2SB709-QRS	[A]	B6
Q16	2SD601-QRS	[Y]	C8
Q17	2SD601-QRS	[Y]	B5
Q18	2SD601-QRS	[Y]	A7
Q19	2SC2404-CD	[U]	C8
Q20	2SC2404-CD	[U]	C8
Q21	2SD601-QRS	[Y]	C7
Q22	2SB709-QRS	[A]	C9
Q23	2SD601-QRS	[Y]	D9
Q24	2SB710-QRS	[C]	D9
Q25	2SB709-QRS	[A]	D8
Q26	2SD601-QRS	[Y]	D8
Q27	2SD601-QRS	[Y]	B5
Q28	2SD601-QRS	[Y]	C9
Q29	2SA1034-ST		C10
Q30	2SD601-QRS	[Y]	C9
Q31	2SB709-QRS	[A]	E8
Q32	2SD601-QRS	[Y]	C7
D1	MA151K	[MH]	F9
D2	MA151K	[MH]	E7
D3	MA151K	[MH]	B5
D5	MA151K	[MH]	D4
D6	MA151K	[MH]	E7
D7	MA151WA	[MN]	E7
D8	MA151K	[MH]	C8

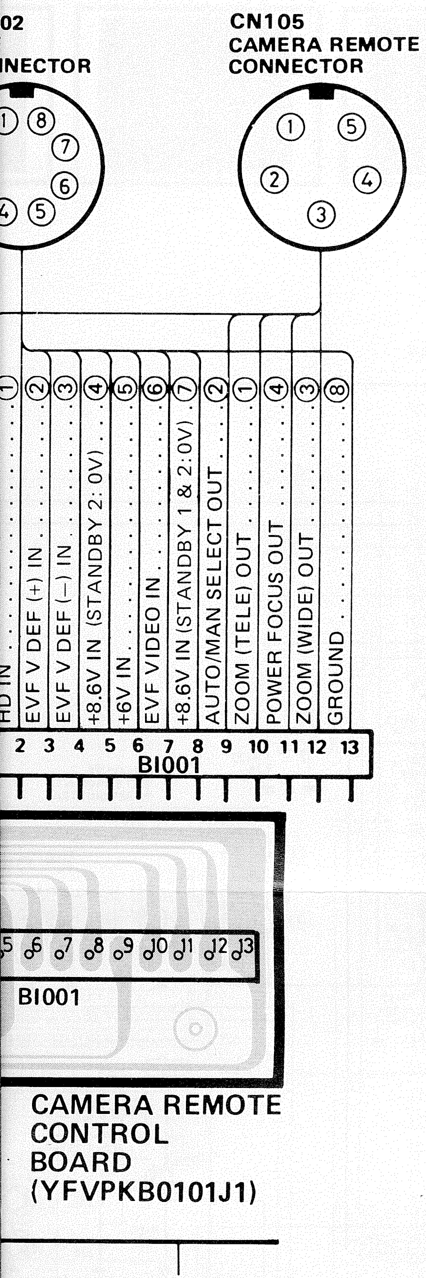
CONDUCTOR VIEW OF CAMERA REMOTE CONTROL BOARD (WV-CR10)

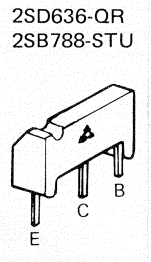

EVF CONNECTOR BOARD (YFVPKB0101J2)
CN106 EVF CONNECTOR
CN102 EVF CONNECTOR
CN105 CAMERA REMOTE CONNECTOR
HD OUT
EVF V. DEF (+) IN
EVF V. DEF (−) IN
+8.6V OUT (STANDBY 2: 0V)
+6V OUT
EVF VIDEO OUT
+8.6V OUT (STANDBY 1 & 2: 0V)
GROUND
SW002 NEAR
SW006 WIDE
SW004 REC
Q005
R016 15K
R015 100K
R014 200
R013 200
Q004
R012 15K
R011 100K
C004 1000PF
C003 1000P F
R010 9.1K
R009 7.5K
R008 91K
R006 22K
MAN
AUTO
SW003
SW001
SW007
SW005
C005 680PF
C001 300PF
C002 1μF50V
R003 12K
R005 22K
Q001
R002 39K
R001 27K
Q003
R007 22K
Q002
R004 27K
BI001
FADE/REC SWITCH OUT
HD IN
EVF V DEF (+) IN
EVF V DEF (−) IN
+8.6V IN (STANDBY 2: 0V)
+6V IN
EVF VIDEO IN
+8.6V IN (STANDBY 1 & 2: 0V)
AUTO/MAN SELECT OUT
ZOOM (TELE) OUT
POWER FOCUS OUT
ZOOM (WIDE) OUT
GROUND
SW003 AUTO/MAN SELECT
SW001 FAR
SW007 TELE
SW005 FADE
CAMERA REMOTE CONTROL BOARD (YFVPKB0101J1)
C
B
A
1
2
3

CONDUCTOR VIEW OF ELECTRONIC VIEWFINDER BOARD (YFVPKA0706JB)


ANODE CAP
CN104 CRT SOCKET
L102 CRT DEFLECTION COIL
V. DEF
H. DEF
GROUND
G3 OUT
G2 OUT
HK : +7.6V OUT (STANDBY1&2:0V)
H : +4.8V OUT (STANDBY2:0V)
G1 OUT
BI1
GROUND
EVF H.DEF OUT
EVF V. DEF (+) OUT
EVF V. DEF (−) OUT
CN2P
VR1 FOCUS
5.6M
R1 5.6M
R2 2.7M
C1 1500μF1KV
C2 1500μF1KV
T1
R3 1M
R4 22K
1M
VR2 BRIGHT
C5 1μF50V
C3 0.082μF
Q2
L1 100μH
C9 100μF10V
C7 220μF10V
C8 5600PF
Q1
D1
C6 47μF 10V
C4 180PF
R7 2.2K
R8 10K
VR3 CONTRAST
4.7K
R10 4.7K
C11 47μF10V
R6 100
L2
VL3 H.SIZE
R9 8.2K
C10 47μF10V
CN2J
CN1J
CN1P
EVF VIDEO IN
+4.8V IN (STANDBY2:0V)
+4.8V IN (STANDBY1&2:0V)
+7.6V IN (STANDBY1&2:0V)
GROUND
HD IN
EVF V. DEF (+) IN
EVF V. DEF (−) IN
ELECTRONIC VEWFINDER BOARD (YFVPKA0706JB)
B
A
1
2
3
4

BOARD (WV-CR10)

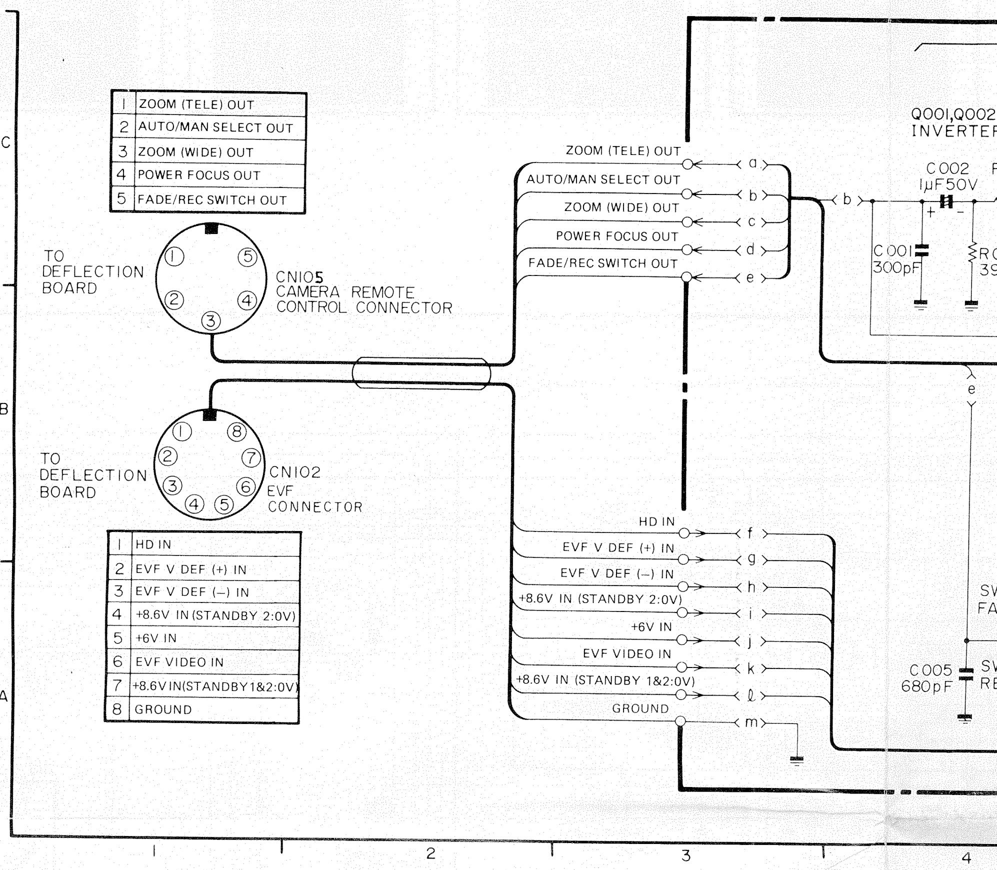

02
INECTOR
CN105
CAMERA REMOTE
CONNECTOR
HD IN
EVF V DEF (+) IN
EVF V DEF (−) IN
+8.6V IN (STANDBY 2: 0V)
+6V IN
EVF VIDEO IN
+8.6V IN (STANDBY 1 & 2:0V)
AUTO/MAN SELECT OUT
ZOOM (TELE) OUT
POWER FOCUS OUT
ZOOM (WIDE) OUT
GROUND
2 3 4 5 6 7 8 9 10 11 12 13
BI001
BI001
CAMERA REMOTE
CONTROL
BOARD
(YFVPKB0101J1)


2SD636-QR
2SB788-STU
E
C
B

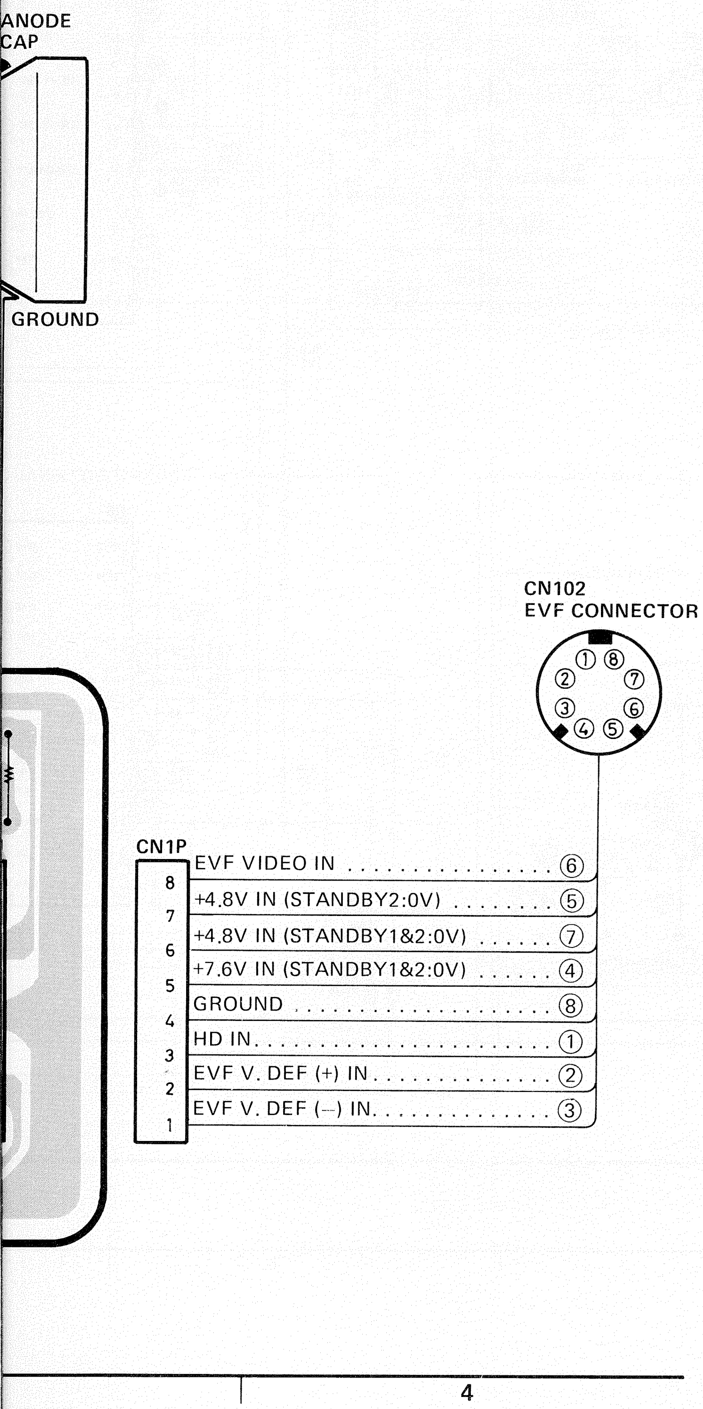
CAMERA REMOTE CONTROL BOARD

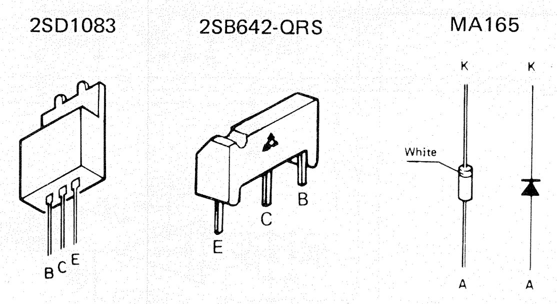
Q001	2SD636-QR
Q002	2SD636-QR
Q003	2SB788-STU
Q004	2SD636-QR
Q005	2SD636-QR

SCHEMATIC DIAGRAM OF CAM


C
B
A
1 ZOOM (TELE) OUT
2 AUTO/MAN SELECT OUT
3 ZOOM (WIDE) OUT
4 POWER FOCUS OUT
5 FADE/REC SWITCH OUT
TO DEFLECTION BOARD
CN105 CAMERA REMOTE CONTROL CONNECTOR
TO DEFLECTION BOARD
CN102 EVF CONNECTOR
1 HD IN
2 EVF V DEF (+) IN
3 EVF V DEF (−) IN
4 +8.6V IN (STANDBY 2:0V)
5 +6V IN
6 EVF VIDEO IN
7 +8.6V IN(STANDBY 1&2:0V)
8 GROUND
ZOOM (TELE) OUT
AUTO/MAN SELECT OUT
ZOOM (WIDE) OUT
POWER FOCUS OUT
FADE/REC SWITCH OUT
HD IN
EVF V DEF (+) IN
EVF V DEF (−) IN
+8.6V IN (STANDBY 2:0V)
+6V IN
EVF VIDEO IN
+8.6V IN (STANDBY 1&2:0V)
GROUND
Q001,Q002
INVERTER
C002
1μF50V
C001
300pF
C005
680pF
1
2
3
4

RD (YFVPKA0706JB)

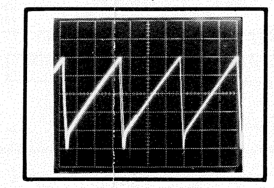

ANODE
CAP
GROUND
CN102
EVF CONNECTOR
CN1P
8 EVF VIDEO IN ⑥
7 +4.8V IN (STANDBY2:0V) ⑤
6 +4.8V IN (STANDBY1&2:0V) ⑦
5 +7.6V IN (STANDBY1&2:0V) ④
4 GROUND ⑧
3 HD IN ①
2 EVF V. DEF (+) IN ②
1 EVF V. DEF (−) IN ③
4


2SD1083
2SB642-QRS
MA165
B C E
E C B
K
White
A

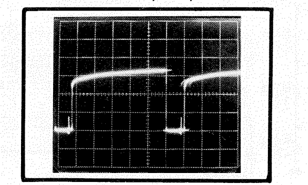
EVF BOARD

Q1	2SD1083	A2
Q2	2SB642-QRS	A2
D1	MA165	A2

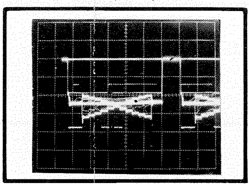
1 0.5V/DIV, 5msec/DIV



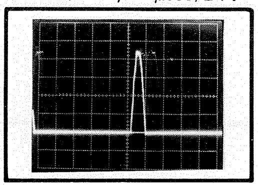
2 0.5V/DIV, 10μsec/DIV



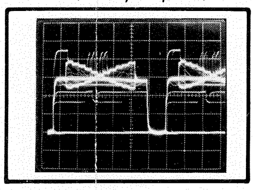
3 1V/DIV, 10μsec/DIV



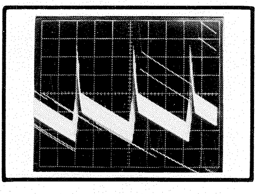
4 1V/DIV, 10μsec/DIV



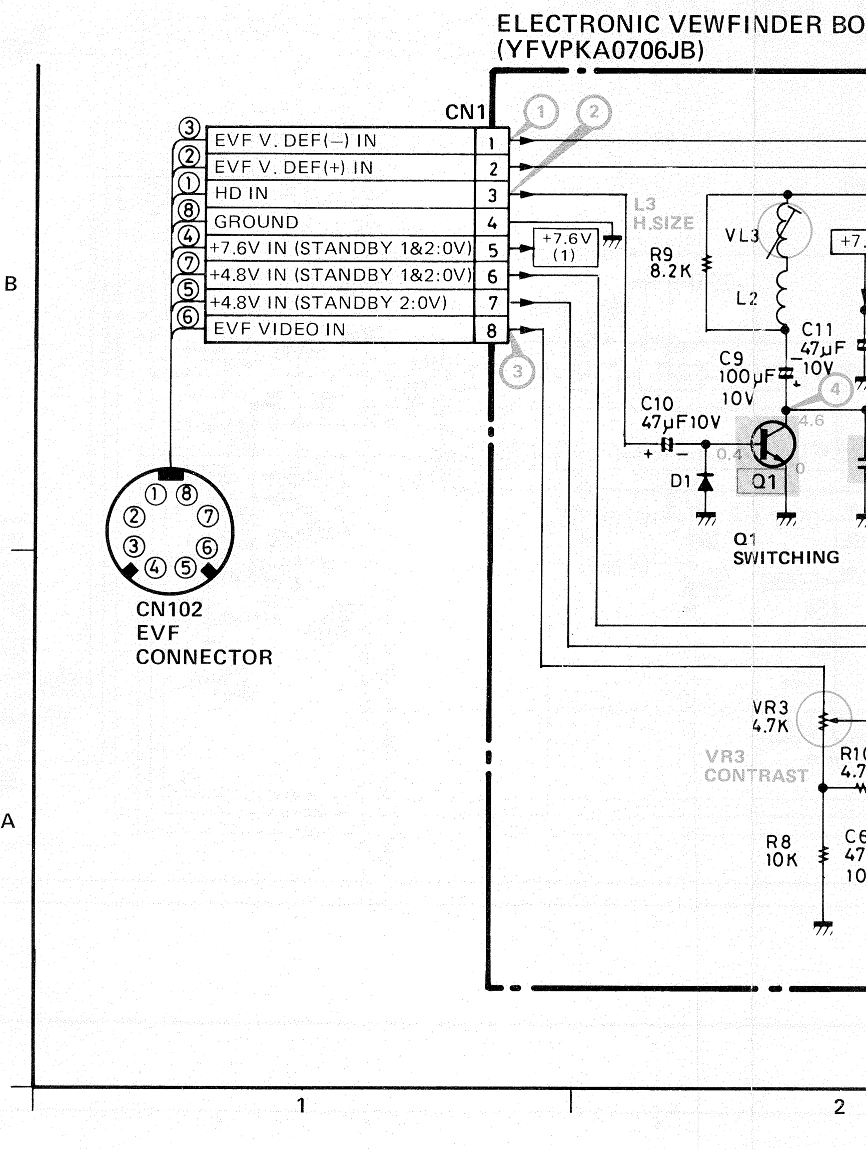
5 20V/DIV, 10μsec/DIV



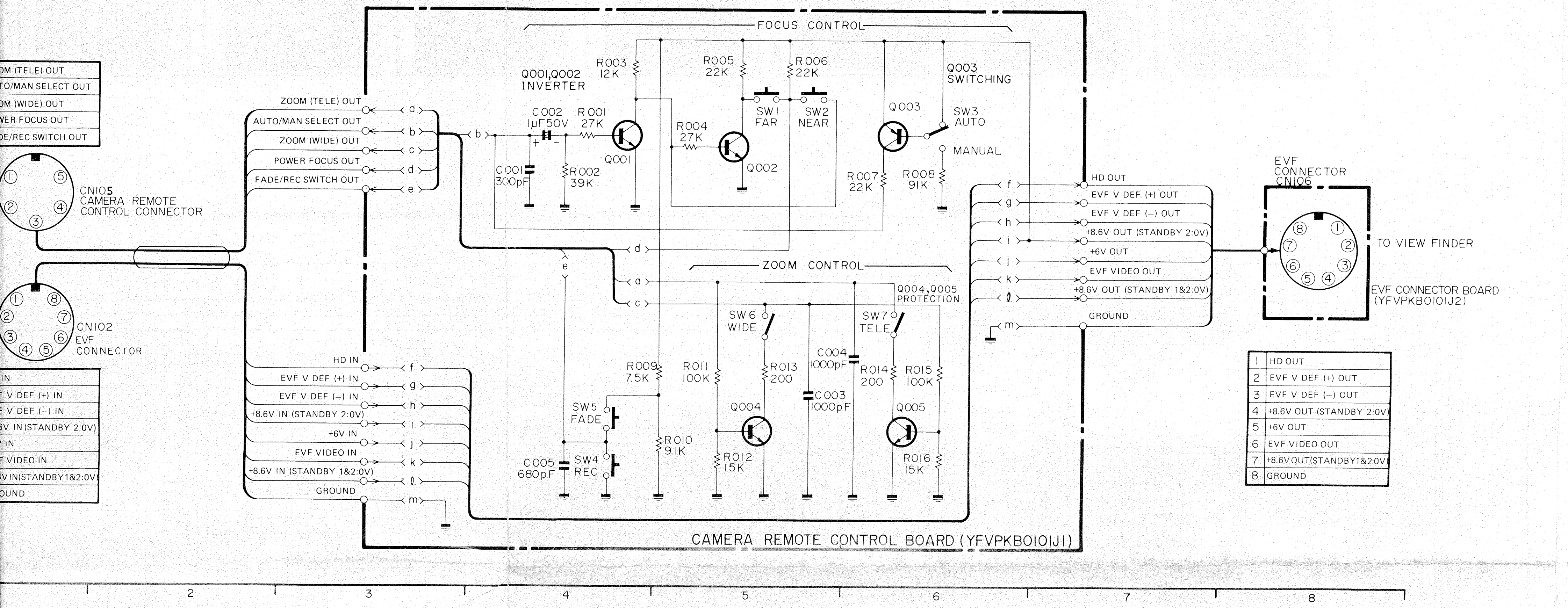
6 2V/DIV, 20μsec/DIV



SCHEMATIC DIAGRAM OF ELECT


ELECTRONIC VEWFINDER BO
(YFVPKA0706JB)
B
A
CN1
③ EVF V. DEF(−) IN 1
② EVF V. DEF(+) IN 2
① HD IN 3
⑧ GROUND 4
④ +7.6V IN (STANDBY 1&2:0V) 5
⑦ +4.8V IN (STANDBY 1&2:0V) 6
⑤ +4.8V IN (STANDBY 2:0V) 7
⑥ EVF VIDEO IN 8
+7.6V (1)
L3 H.SIZE
VL3
R9 8.2K
L2
C11 47μF 10V
C9 100μF 10V
C10 47μF10V
D1
Q1
Q1 SWITCHING
CN102
EVF
CONNECTOR
VR3 4.7K
VR3 CONTRAST
R8 10K
1
2

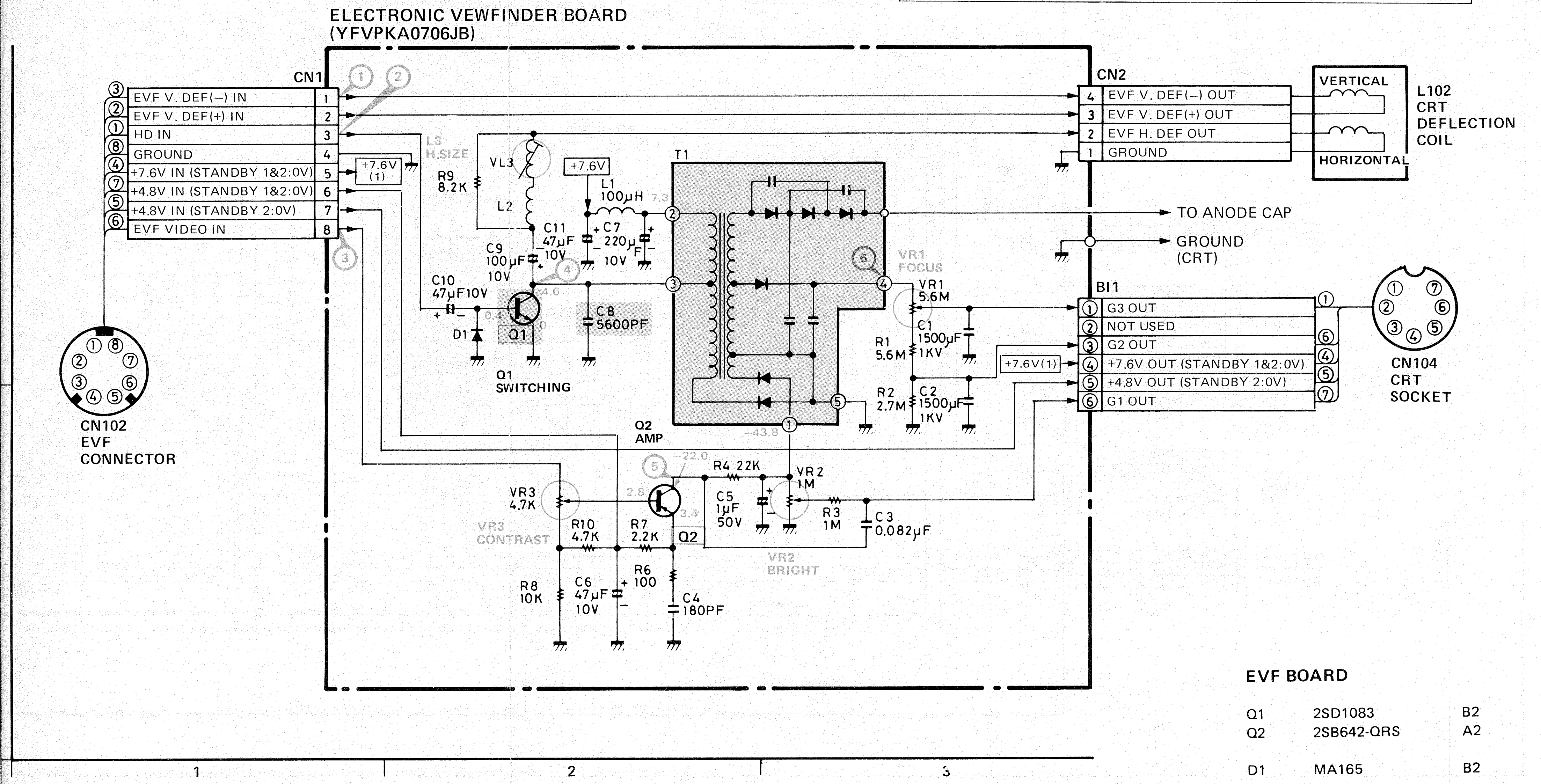
SCHEMATIC DIAGRAM OF CAMERA REMOTE CONTROL BOARD (WV-CR10)


FOCUS CONTROL
Q001,Q002 INVERTER
R003 12K
R005 22K
R006 22K
Q003 SWITCHING
C002 1μF50V
R001 27K
R004 27K
SW1 FAR
SW2 NEAR
Q003
SW3 AUTO
MANUAL
C001 300pF
R002 39K
Q001
Q002
R007 22K
R008 91K
ZOOM (TELE) OUT
AUTO/MAN SELECT OUT
ZOOM (WIDE) OUT
POWER FOCUS OUT
FADE/REC SWITCH OUT
CN105 CAMERA REMOTE CONTROL CONNECTOR
CN102 EVF CONNECTOR
ZOOM CONTROL
Q004,Q005 PROTECTION
SW6 WIDE
SW7 TELE
C004 1000pF
R009 7.5K
R011 100K
R013 200
R014 200
R015 100K
C003 1000pF
SW5 FADE
Q004
Q005
R010 9.1K
R012 15K
R016 15K
C005 680pF
SW4 REC
HD IN
EVF V DEF (+) IN
EVF V DEF (–) IN
+8.6V IN (STANDBY 2:0V)
+6V IN
EVF VIDEO IN
+8.6V IN (STANDBY 1&2:0V)
GROUND
HD OUT
EVF V DEF (+) OUT
EVF V DEF (–) OUT
+8.6V OUT (STANDBY 2:0V)
+6V OUT
EVF VIDEO OUT
+8.6V OUT (STANDBY 1&2:0V)
GROUND
EVF CONNECTOR CN106
TO VIEW FINDER
EVF CONNECTOR BOARD (YFVPKB0101J2)
CAMERA REMOTE CONTROL BOARD (YFVPKB0101J1)
1 HD OUT
2 EVF V DEF (+) OUT
3 EVF V DEF (–) OUT
4 +8.6V OUT (STANDBY 2:0V)
5 +6V OUT
6 EVF VIDEO OUT
7 +8.6V OUT(STANDBY1&2:0V)
8 GROUND
2
3
4
5
6
7
8

SCHEMATIC DIAGRAM OF ELECTRONIC VIEWFINDER BOARD (YFVPKA0706JB)

PRODUCT SAFETY NOTE

The shaded area on this schematic diagram incorporates special features important for protection from X-Radiation, fire and electrical shock hazards. When servicing it is essential that only manufacturer's specified parts be used for the critical components in the shaded areas of the schematic.


ELECTRONIC VEWFINDER BOARD (YFVPKA0706JB)
CN1
EVF V. DEF(–) IN
EVF V. DEF(+) IN
HD IN
GROUND
+7.6V IN (STANDBY 1&2:0V)
+4.8V IN (STANDBY 1&2:0V)
+4.8V IN (STANDBY 2:0V)
EVF VIDEO IN
CN102 EVF CONNECTOR
L3 H.SIZE
VL3
R9 8.2K
L2
+7.6V
L1 100μH
T1
C11 47μF 10V
C7 220μF 10V
C9 100μF 10V
C10 47μF10V
C8 5600PF
D1
Q1
Q1 SWITCHING
Q2 AMP
VR1 FOCUS
VR1 5.6M
C1 1500μF 1KV
R1 5.6M
R2 2.7M
C2 1500μF 1KV
+7.6V(1)
-43.8
-22.0
R4 22K
VR2 1M
VR3 4.7K
VR3 CONTRAST
R10 4.7K
R7 2.2K
Q2
C5 1μF 50V
R3 1M
C3 0.082μF
VR2 BRIGHT
R6 100
R8 10K
C6 47μF 10V
C4 180PF
CN2
EVF V. DEF(–) OUT
EVF V. DEF(+) OUT
EVF H. DEF OUT
GROUND
VERTICAL
HORIZONTAL
L102 CRT DEFLECTION COIL
TO ANODE CAP
GROUND (CRT)
BI1
G3 OUT
NOT USED
G2 OUT
+7.6V OUT (STANDBY 1&2:0V)
+4.8V OUT (STANDBY 2:0V)
G1 OUT
CN104 CRT SOCKET
1
2
3

EVF BOARD

Q1	2SD1083	B2
Q2	2SB642-QRS	A2
D1	MA165	B2

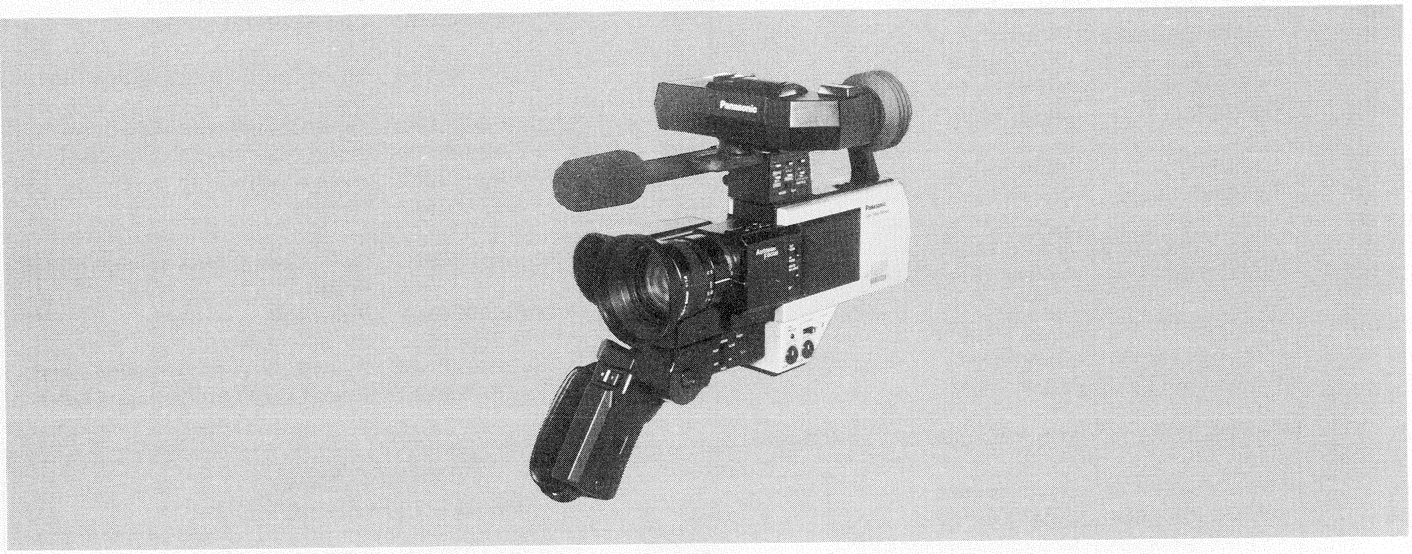
ORDER NO. VKD83070765C4

Service Manual

Vol. 4

Replacement Parts List
Exploded View

Color Video Camera
WV-4860



CONTENTS

PARTS LIST

Camera

- Miscellaneous 1
- Preamplifier Board (YFVPKA0702JA) . . . . 1~2
- Deflection Board (YFVKY4860P1A) . . . . 2~4
- Process Board (YFVKZ4860P3A) . . . . 4~7
- Micro Processor Board (YFVKY3230P4A) . . . . 7~8
- Micro Processor Subboard (YFVPKA0714JA) 8
- Standby Board (YFVAKA0166AN) 8
- Audio/Lens Control Board (YFVKY3230P5A) . . . . 8~9
- Display Key Board A (YFVAKA0170AN) 9
- Display Key Board B (YFVAKA0169AN) 9
- INT Mic Board (YFVKZ3230PBA) . . . . 9~10
- EXT Mic Board (YFVKZ3230PAA) 10
- Earphone Board (YFVAKA0136AN) 10
- Grip Assembly (YFVAKA0167AN) 10
- REC Switch Board (YWV3100ZK07) 10
- Zoom Switch Board (YFVPKA0709JA) 10
- Fade/AGC Switch Board (YFVKZ3230P8A) 10
- Microphone Assembly (WM-4043) 11
- EVF Miscellaneous (YFVAKA0165AN) 11
- EVF Board (YFVPKA0706JB) 11
- Auto Focus Lens Unit (YFUAF82) 11
- Auto Focus Board-A (YFES950-43A) 12
- Auto Focus Board-B (YFES950-43B) . . . . 12~13
- Auto Focus Board-C (YFES950-43C) 13
- Accessory Parts/Packaging Parts 13

- Camera Remote Controller (WV-CR10)

- Miscellaneous 13
- Camera Remote Controller Board (YFVPKB0101JA) 13
- Connector Board (YFVPKB0101J2) 13
- Accessory Parts/Packaging Parts 13

EXPLODED VIEW

- Camera/Microphone 14
- Electronic Viewfinder 15
- Auto Focus Lens Unit 16
- Packaging Case 17
- Camera Remote Controller 18
- Packaging Case 19

Panasonic

Panasonic Tokyo
Matsushita Electric Industrial Co., Ltd.
1-2, 1-chome, Shibakoen, Minato-ku, Tokyo 105 Japan

Vol. 4

Important Notice

REPLACEMENT PARTS LIST

1. Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.
2. Components identified by * mark are new parts used from this model.

MODEL WV-4860

MISCELLANEOUS

SYMBOL NO.	PART NO.	DESCRIPTION
V101	* YFS4158KIT	Pick-up Tube Kit
X101	YWIR1R6X16R5	IR Filter
X102	YFXTALLPFC70	Crystal Filter
L101	* YFS4158KIT	Deflection Coil Ass y
SW101	*D2MQ1L	Micro Switch
SW102	*D2MQ1L	Micro Switch
CN101	* YFCABLE3230	Camera Cable and VTR Connector
CN102	* D8113N601	8 pin EVF Connector
CN103	* VIDSOCKETC70	Pick-up Tube Socket
CN105	* D5113N600	Camera Remote Control Connector
CN107	* EMCUSA20D04	Lens Connector
M1	* YFV5EB0124A1	Upper Cover
M2	* YFV5EB0125A1	Handle Cover
M3	YFV5EB0126AS	Display key Cover Ass y
M4	* YFV2SA0078A4	Mounting Angle for Circuit Board
M5	* YFV2CA0024A4	Mounting Plate
M6	* YFV4JA0043A4	Support Spring
M7	* YFV5MA0007B4	Mounting Shoe for EVF
M8	* YFV6FA0019A3	Mounting Bracket for Shoe
M9	* YFV1FA0004A4	Mounting Nut for Shoe
M10	* YFV9AA0147AN	EVF Connector Cover Ass y
M11	* YFV3CA0026A4	Mounting Base for Microphone
M12	* YFV2KB0052A4	Rear Chassis
M13	* YFV2TB0031A4	Shoulder Belt Mounting Bracket
M14	* YFV9AA0145AN	Right Side Cover Ass y
M15	* YFV9AA0146AN	Left Side Cover Ass y
M16	* YFV5ED0118A3	Left Bottom Cover
M18	* YFV5EC0117A3	CC/WB Cover
M19 ⚠	* YFV7MA0051AS	Bottom Cover Ass y
M20	* YFV9AA0153AN	Shoulder Pad Ass y
M21	* YFV5EC0115A3	Front Cover
M22	* YF701309	Body Mounting
M23	* YF501050	Mounting Spring
M24	* YF701301	Lens Base Ass y
M25	* YF701354	W/V Filter Ass y
M26	* YF701355	C/C Filter Ass y
M27	* YF701310	Earth Spring (x2)
M28	* YF701304	Filter Mounting Screws (x2)
M29	* YF701311	Flik Spring (x2)
M30	* YF701312	Flik Ball
M31	* YF701501	Lock Knob
M32	* YF700005	Lock Spring
M35	* YFV3CA0022A4	Coil Holder A
M36	* YFV3CA0025A4	Crystal Holder B
M37	* YFV3CA0024B4	Crystal Holder A
M38	* YFV4JA0040B4	Wave Washer
M39	* YFV1KA0012A4	Round Plain Washer
M40	* YFV3FA0012A4	Backfocus Adjusting Ring
M41	* YFV2KA0051B1	Optical Coil Chassis
M42	* YFV2HA0080A4	Shield Case for Preamplifier
M43	* YFV2HA0081B4	Coil Holder Shield Plate
M44	* YFV2CA0027A4	Preamplifier Board Holder Shield Plate
M45	* YFV2HA0082A4	Bias Light Shield Plate A
M46	* YFV2HA0083A4	Bias Light Shield Plate B
M47	* YFV3CA0023A4	Coil Holder
M48	* YFV2HA0095B4	Shield Cover A for Micro Processor Board
M49	* YFV2HA0100A4	Shield Cover B for Process Board
M50	* YFV2HH0098C4	Shield Cover C for EXT Mic Jack
M51	* YFV2EA0014A3	Hinge A (x3)
M52	* YFV2EA0015A3	Hinge B
M53	* YFV2HA0099B4	Shield Cover C for Audio/Lens Control Board
M55 ⚠	* YFV7SE0079A4	Main Label
M57	* YVZC700RB50	Serial No. Label
M62	* YFV2HA0087A4	Shield Cover A for Deflection Board
M63	* YFV2HA0088A4	Shield Cover B for Deflection Board

YFVPKA0702JA PREAMPLIFIER BOARD

SYMBOL NO.	PART NO.	DESCRIPTION	
PCB001	* YFVPKA0702JA	Printed Circuit Board Assembly	
Q1	2SK316-PQ	Transistor	
Q2	2SA1022-CD	Transistor	
Q3	2SC2404-CD	Transistor	
Q4	2SA1022-CD	Transistor	
Q5	2SD601-QRS	Transistor	
D1	MA165	Diode	
R1	ERJ8GCSK565	Carbon	5.6 ohms 1/8W
R2	ER050CKG2704	Metal	2.7M ohms 1/2W
R3	ERJ8GCSJ431	Carbon	430 ohms 1/8W
R4	ERJ8GCSJ151	Carbon	150 ohms 1/8W
R5	ERJ8GCSJ104	Carbon	100K ohms 1/8W
R6	ERJ8GCSJ622	Carbon	6.2K ohms 1/8W
R7	ERJ8GCSG152	Carbon	1.5K ohms 1/8W
R8	ERJ8GCSJ682	Carbon	6.8K ohms 1/8W
R9	ERJ8GCSG102	Carbon	1K ohms 1/8W
R10	ERJ8GCSG151	Carbon	150 ohms 1/8W
R11	ERJ8GCSJ273	Carbon	27K ohms 1/8W
R12	ERJ8GCSJ134	Carbon	130K ohms 1/8W
R13	ERJ8GCSG201	Carbon	200 ohms 1/8W
R14	ERJ8GCSG122	Carbon	1.2K ohms 1/8W
R15	ERJ8GCSJ562	Carbon	5.6K ohms 1/8W
R17	ERJ8GCSJ224	Carbon	220K ohms 1/8W
C1	YF426H273XKS	Ceramic	0.027 μF 50V
C2	ECEA25Z4R7	Electrolytic	4.7 μF 25V
C3	ECEA1AF470	Electrolytic	47 μF 10V
C4	YF426180CHJS	Ceramic	18 pF 50V
C5,6	ECEA25Z3R3	Electrolytic	3.3 μF 25V
C8	YF426030SLDS	Ceramic	3 pF 50V
C9	ECEA1ESS4R7	Electrolytic	4.7 μF 25V
C10	YF426H273XKS	Ceramic	0.027 μF 50V
C11	ECEA1AF470	Electrolytic	47 μF 10V
CT1	CTC6U030	Trimmer Capacitor	

SYMBOL NO.	PART NO.	DESCRIPTION	
L2	YWL58R2J	Coil	8.2 µH
J1-4	ERJ8GCSJ0R00	Jumper Resistor	
CN1	YFL360	Connector	
BI1	EMCZ0311B01V	3 pin Connecting Wire Ass y for BI1 and CN4 (Process)	
M60	YFV1KA0002A4	Mounting Spacer	

YFVKY4860P1A
DEFLECTION BOARD

SYMBOL NO.	PART NO.	DESCRIPTION	
PCB002	* YFVKY4860P1A	Printed Circuit Board Assembly	
IC1	NJM2048MC	IC	
IC2,3	NJM3415M	IC	
IC4	NJM2903M	IC	
IC5	AN2510S	IC	
Q1	2SB837-CD	Transistor	
Q2	2SD601-QRS	Transistor	
Q3-5	2SB709-QRS	Transistor	
Q6	2SD601-QRS	Transistor	
Q7	2SD973-QRS	Transistor	
Q8,9	2SB710-QRS	Transistor	
Q11	2SD1030RST	Transistor	
Q12	2SC2404-CD	Transistor	
Q13	2SD1030-T	Transistor	
Q14	2SD601-QRS	Transistor	
Q15	2SD602-QRS	Transistor	
Q16	2SD1083	Transistor	
Q17	2SC2405STU	Transistor	
Q18	2SD814-QRS	Transistor	
Q19,20	2SB814-QRS	Transistor	
Q21	2SD601-QRS	Transistor	
Q22	2SB814-QRS	Transistor	
Q24	2SB709-QRS	Transistor	
Q25	2SD601-QRS	Transistor	
Q26	2SD602-QRS	Transistor	
Q27	2SD1083	Transistor	
Q28	2SB814-QRS	Transistor	
Q29	2SB793-RS	Transistor	
Q30,31	2SD601-QRS	Transistor	
Q32	2SB814-QRS	Transistor	
Q33	2SD814-QRS	Transistor	
Q40	2SD1030RST	Transistor	
D1	EK14	Diode	
D2	HZ3BLL	Diode	
D3	MA151K	Diode	
D4	MA165	Diode	
D5	MA151K	Diode	
D6	MA165	Diode	
D7	MA171	Diode	
R1	ERJ8GCSJ682	Carbon	6.8K ohms 1/8W
R2	ERJ8GCSJ102	Carbon	1K ohms 1/8W
R3	ERJ8GCSG332	Carbon	3.3K ohms 1/8W
R5	ERJ8GCSG303	Carbon	30K ohms 1/8W
R6	ERJ8GCSJ912	Carbon	9.1K ohms 1/8W
R7	ERJ8GCSG222	Carbon	2.2K ohms 1/8W
R8	ERJ8GCSJ224	Carbon	220K ohms 1/8W

SYMBOL NO.	PART NO.	DESCRIPTION	
R9	ERJ8GCSJ561	Carbon	560 ohms 1/8W
R10	ERJ8GCSJ332	Carbon	3.3K ohms 1/8W
R11	ER010CKF3901	Metal	3.9K ohms 1/8W
R12	ER010CKF5601	Metal	5.6K ohms 1/8W
R13	ERJ8GCSJ203	Carbon	20K ohms 1/8W
R14	ERJ8GCSG123	Carbon	12K ohms 1/8W
R15	ERJ8GCSG153	Carbon	15K ohms 1/8W
R16	ERJ8GCSJ223	Carbon	22K ohms 1/8W
R18	ERJ8GCSK225	Carbon	2.2M ohms 1/8W
R19	ERJ8GCSJ154	Carbon	150K ohms 1/8W
R20	ERJ8GCSJ103	Carbon	10K ohms 1/8W
R21	ERJ8GCSJ391	Carbon	390 ohms 1/8W
R22	ERJ8GCSG303	Carbon	30K ohms 1/8W
R23	ERJ8GCSG512	Carbon	5.1K ohms 1/8W
R24	ERJ8GCSJ224	Carbon	220K ohms 1/8W
R25	ERJ8GCSJ563	Carbon	56K ohms 1/8W
R26,27	ERJ8GCSJ102	Carbon	1K ohms 1/8W
R28	ERJ8GCSJ223	Carbon	22K ohms 1/8W
R29	ERJ8GCSJ561	Carbon	560 ohms 1/8W
R30	ERJ8GCSJ221	Carbon	220 ohms 1/8W
R31	ER010CKF18R0	Metal	18 ohms 1/8W
R32	ERJ8GCSJ161	Carbon	160 ohms 1/8W
R33	ERJ8GCSJ181	Carbon	180 ohms 1/8W
R34	ERJ8GCSJ182	Carbon	1.8K ohms 1/8W
R35	ERSA39J332	Solid	3.3K ohms 1/8W
R36	ERJ8GCSJ274	Carbon	270K ohms 1/8W
R37	ERJ8GCSJ221	Carbon	220 ohms 1/8W
R38	ERJ8GCSJ333	Carbon	33K ohms 1/8W
R39	ERJ8GCSJ153	Carbon	15K ohms 1/8W
R40	ER0S2TKF4303	Metal	430K ohms 1/8W
R41	ERJ8GCSJ391	Carbon	390 ohms 1/8W
R42	ERJ8GCSJ302	Carbon	3K ohms 1/8W
R43	ERJ8GCSJ223	Carbon	22K ohms 1/8W
R44	ERJ8GCSJ222	Carbon	2.2K ohms 1/8W
R45	ER010CKF33R0	Metal	33 ohms 1/8W
R46	ERJ8GCSJ512	Carbon	5.1K ohms 1/8W
R47	ERJ8GCSJ223	Carbon	22K ohms 1/8W
R48	ERJ8GCSJ103	Carbon	10K ohms 1/8W
R49	ERJ8GCSJ333	Carbon	33K ohms 1/8W
R50	ERJ8GCSJ223	Carbon	22K ohms 1/8W
R51	ERJ8GCSJ332	Carbon	3.3K ohms 1/8W
R52	ERJ8GCSJ153	Carbon	15K ohms 1/8W
R53,54	ERJ8GCSJ823	Carbon	82K ohms 1/8W
R55	ERJ8GCSJ273	Carbon	27K ohms 1/8W
R56	ERJ8GCSJ333	Carbon	33K ohms 1/8W
R57	ERJ8GCSJ184	Carbon	180K ohms 1/8W
R58,59	ERJ8GCSJ223	Carbon	22K ohms 1/8W
R60	ERJ8GCSJ682	Carbon	6.8K ohms 1/8W
R61	ERJ8GCSJ222	Carbon	2.2K ohms 1/8W
R62	ERJ8GCSJ823	Carbon	82K ohms 1/8W
R63	ERJ8GCSJ624	Carbon	620K ohms 1/8W
R64	ERJ8GCSJ153	Carbon	15K ohms 1/8W
R65	ERJ8GCSJ683	Carbon	68K ohms 1/8W
R66	ERJ8GCSJ104	Carbon	100K ohms 1/8W
R67	ERJ8GCSJ330	Carbon	33 ohms 1/8W
R68	ERJ8GCSJ151	Carbon	150 ohms 1/8W

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SYM-BOL NO.	PART NO.	DESCRIPTION		SYM-BOL NO.	PART NO.	DESCRIPTION	
R69	ERJ8GCSJ332	Carbon	3.3K ohms 1/8W	C14	YF426473XMS	Ceramic	0.047 µF 50V
R71	ERD10TJ3R3	Carbon	3.3 ohms 1/8W	C15	ECKF1H102KB	Ceramic	1000 pF 50V
R72	ERJ8GCSJ560	Carbon	56 ohms 1/8W	C16	ECEA1ASS470	Electrolytic	47 µF 10V
R73	ERJ8GCSJ102	Carbon	1K ohms 1/8W	C17	ECEA1ASS470	Electrolytic	47 µF 10V
R74	ERJ8GCSJ512	Carbon	5.1K ohms 1/8W	C18	ECEA1AF101	Electrolytic	100 µF 10V
R75	ERJ8GCSJ623	Carbon	62K ohms 1/8W	C19	ECQM1H124KZ	Plastic	0.12 µF 50V
R76	ERJ8GCSJ222	Carbon	2.2K ohms 1/8W	C20	ECQP1301JZ	Plastic	300 pF 100V
R77	ERJ8GCSJ561	Carbon	560 ohms 1/8W	C21	YF426561SLJS	Ceramic	560 pF 50V
R79	ERJ8GCSJ334	Carbon	330K ohms 1/8W	C22	ECEA1ASS470	Electrolytic	47 µF 10V
R80	ERJ8GCSG512	Carbon	5.1K ohms 1/8W	C23	ECQK1104JG	Plastic	0.1 µF
R81	ERJ8GCSG242	Carbon	2.4K ohms 1/8W	C24	YF426473XMS	Ceramic	0.047 µF 50V
R82	ERJ8GCSJ333	Carbon	33K ohms 1/8W	C25	YF426102XMS	Ceramic	1000 pF 50V
R83	ERJ8GCSJ562	Carbon	5.6K ohms 1/8W	C26	ECEA1ASS470	Electrolytic	47 µF 10V
R84	ERJ8GCSJ271	Carbon	270 ohms 1/8W	C27	ECEA1ESS4R7	Electrolytic	4.7 µF 25V
R85	ERJ8GCSJ151	Carbon	150 ohms 1/8W	C28	YF426272XMS	Ceramic	2700 pF 50V
R87-89	ERJ8GCSJ273	Carbon	27K ohms 1/8W	C29	YF426473XMS	Ceramic	0.047 µF 50V
R90	ERJ8GCSJ105	Carbon	1M ohms 1/8W	C30	ECEA1ASS470	Electrolytic	47 µF 10V
R91	ERJ8GCSK225	Carbon	2.2M ohms 1/8W	C31	ECEA2AS010	Electrolytic	1 µF 100V
R92	ERJ8GCSJ271	Carbon	270 ohms 1/8W	C33	ECEA0JSS221	Electrolytic	220 µF 6.3V
R93	ERJ8GCSJ332	Carbon	3.3K ohms 1/8W	C34	ECEA1ASS470	Electrolytic	47 µF 10V
R94,95	ERJ8GCSJ222	Carbon	2.2K ohms 1/8W	C35	ECEA1ASS470	Electrolytic	47 µF 10V
R96	ERJ8GCSJ150	Carbon	15 ohms 1/8W	C36	ECQM1H684JZ	Plastic	0.68 µF 50V
R98	ERJ8GCSJ102	Carbon	1K ohms 1/8W	C37	ECQP1152JZ	Plastic	1500 pF 100V
R99	ERJ8GCSJ392	Carbon	3.9K ohms 1/8W	C38	ECEA1CSS100	Electrolytic	10 µF 16V
R100	ERJ8GCSJ472	Carbon	4.7K ohms 1/8W	C39	YF426223XKS	Ceramic	0.022 µF 50V
R101	ERJ8GCSK225	Carbon	2.2M ohms 1/8W	C40	ECQM1H224KZ	Plastic	0.22 µF 50V
R103	ERJ8GCSJ682	Carbon	6.8K ohms 1/8W	C41	YF426102XMS	Ceramic	1000 pF 50V
R104	ERJ8GCSK2R2	Carbon	2.2 ohms 1/8W	C42	YF426911CHJS	Ceramic	910 pF 50V
R108	ERO10CKF3302	Metal	33K ohms 1/8W	C43	ECEA1ESS4R7	Electrolytic	4.7 µF 25V
VR1	YWH0651A33K	Variable Resistor	33K ohms	C44	ECEA1ASS470	Electrolytic	47 µF 10V
VR2	YWH0621A100	Variable Resistor	100 ohms	C45	ECEA1ASS221	Electrolytic	220 µF 10V
VR3	YFH0521A10K	Variable Resistor	10K ohms	C46	ECQP1432JZ	Plastic	4300 pF 100V
VR4	YWH0651A1R5K	Variable Resistor	1.5K ohms	C47,48	ECEA2AS3R3	Electrolytic	3.3 µF 100V
				C50	DE979B152K	Ceramic	1500 pF 50V
VR5	YFH0621A150K	Variable Resistor	150K ohms	C51	ECQE2473KS	Plastic	0.047 µF 250V
VR6	YWH0651A4R7K	Variable Resistor	4.7K ohms	C52	ECEA1AF470	Electrolytic	47 µF 10V
VR7	YFH0521A47K	Variable Resistor	47K ohms	C53	ECQE2473KS	Plastic	0.047 µF 250V
VR8,9	YWH0651A47K	Variable Resistor	47K ohms	C54	YF426272XMS	Ceramic	2700 pF 50V
VR10	YFH0521A47K	Variable Resistor	47K ohms				
				C57	YF426473XMS	Ceramic	0.047 µF 50V
VR11	YWH0651A100	Variable Resistor	100 ohms	C60	ECEA1CN100S	Electrolytic	10 µF 16V
VR12	YWH0651A4R7K	Variable Resistor	4.7K ohms	C61	ECEA1HN010S	Electrolytic	1 µF 50V
VR13	YWH0651A10K	Variable Resistor	10K ohms	L1	YFPC470K	Coil	47 µH
VR14	YFH0651A2R2M	Variable Resistor	2.2M ohms	L2	YFPF331K	Coil	330 µH
BVR1	EVM71GA00114	Block Resistor					
				L3	YFPC470K	Coil	47 µH
C1	ECEA1AF470	Electrolytic	47 µF 10V	L4	YFLH103JZ	Coil	10 mH
C2	ECEA1ES100	Electrolytic	10 µF 25V	VL5	YFVL303	Coil	30 mH
C3	YF426102XMS	Ceramic	1000 pF 50V	L6	YFVC101J	Coil	100 mH
C5	ECEA1EF330	Electrolytic	33 µF 25V	T1	ECXC0075	Flyback Transformer	
C6	ECEA1AS221	Electrolytic	220 µF 10V				
				T2	YFVL801	Flyback Transformer	
C7	YF426331CHJS	Ceramic	330 pF 50V	F1 ⚠	ICPF25	Current Fuse	1A
C8	ECEA1ASS470	Electrolytic	47 µF 10V	J10	ERJ8GCSJ0R00	Jumper Resistor	
C9	ECEA1AF101	Electrolytic	100 µF 10V	CN1-JM	EMCS0650Z	6 pin Jack Male	
C10	ECEA0JSS101	Electrolytic	100 µF 6.3V	CN2-JM	EMCS0850Z	8 pin Jack Male	
C11	ECEA1ASS470	Electrolytic	47 µF 10V				
				CN3-JM	EMCS0550Z	5 pin Jack Male	
C12	ECEA1ESS4R7	Electrolytic	4.7 µF 25V	CN4-JM	EMCS0250Z	2 pin Jack Male	
C13	ECEA1HSS2R2	Electrolytic	2.2 µF 50V	CN5-JM	EMCS0250Z	2 pin Jack Male	

SYM-BOL NO.	PART NO.	DESCRIPTION
CN6-JM	EMCS1050Z	10 pin Jack Male
CN7-JM	EMCS0550Z	5 pin Jack Male
CN8-JM	EMCS0250Z	2 pin Jack Male
BI1	VIDSOKETC70	6 pin Connector Wire Ass y for BI1 and CN103
E2	YFFSN23A10V	10p Flat Cable for CN8 (Process)
E3	YFFSN23A7V	7p Flat Cable for CN7 (Process)
M61	YFV2HA0086A4	Shield Case

YFVKZ4860P3A
PROCESS BORD

SYM-BOL NO.	PART NO.	DESCRIPTION
PCB003	* YFVKZ4860P3A	Printed Circuit Board Assembly
IC1	AN2560S	IC
IC2	AN2110S	IC
IC3	AN2310S	IC
IC4	AN2320S	IC
IC5	AN6914S	IC
IC6	* YFS4158KIT	IC Ass y for IC6, V1 and L1
IC7	NJM3414M	IC
IC8	AN2210S	IC
IC9	MN8029	IC
IC10	AN2410S	IC
IC11	MN6064	IC
Q1	2SB709-QRS	Transistor
Q2	2SC2404-CD	Transistor
Q3-6	2SD601-QRS	Transistor
Q7	2SD602-QRS	Transistor
Q8-10	2SB709-QRS	Transistor
Q11	2SD601-QRS	Transistor
Q12	2SB709-QRS	Transistor
Q13,14	2SD601-QRS	Transistor
Q15	2SB709-QRS	Transistor
Q16-18	2SD601-QRS	Transistor
Q19,20	2SC2404-CD	Transistor
Q21	2SD601-QRS	Transistor
Q22	2SB709-QRS	Transistor
Q23	2SD601-QRS	Transistor
Q24	2SB710-QRS	Transistor
Q25	2SB709-QRS	Transistor
Q26-28	2SD601-QRS	Transistor
Q29	2SA1034-ST	Transistor
Q30	2SD601-QRS	Transistor
Q31	2SB709-QRS	Transistor
Q32	2SD601-QRS	Transistor
D1-3	MA151K	Diode
D5,6	MA151K	Diode
D7	MA151K	Diode
D8	MA151K	Diode
R1	ERJ8GCSG273	Carbon 27K ohms 1/8W
R3	ERJ8GCSJ303	Carbon 30K ohms 1/8W
R4	ERJ8GCSJ123	Carbon 12K ohms 1/8W
R5	ERJ8GCSJ682	Carbon 6.8K ohms 1/8W

SYM-BOL NO.	PART NO.	DESCRIPTION
R6	ERJ8GCSJ473	Carbon 47K ohms 1/8W
R7	ERJ8GCSJ223	Carbon 22K ohms 1/8W
R9	ERJ8GCSJ123	Carbon 12K ohms 1/8W
R10-12	ERJ8GCSJ102	Carbon 1K ohms 1/8W
R13	ERJ8GCSJ103	Carbon 10K ohms 1/8W
R14	ERJ8GCSJ102	Carbon 1K ohms 1/8W
R15	ERJ8GCSJ471	Carbon 470 ohms 1/8W
R17	ERJ8GCSJ123	Carbon 12K ohms 1/8W
R18,19	ERJ8GCSJ332	Carbon 3.3K ohms 1/8W
R21	ERJ8GCSJ392	Carbon 3.9K ohms 1/8W
R22	ERJ8GCSJ222	Carbon 2.2K ohms 1/8W
R23	ERJ8GCSJ393	Carbon 39K ohms 1/8W
R24	ERJ8GCSJ222	Carbon 2.2K ohms 1/8W
R25	ERJ8GCSJ184	Carbon 180K ohms 1/8W
R26	ERJ8GCSJ563	Carbon 56K ohms 1/8W
R27	ERJ8GCSJ911	Carbon 910 ohms 1/8W
R28	ERJ8GCSJ561	Carbon 560 ohms 1/8W
R29	ERJ8GCSJ333	Carbon 33K ohms 1/8W
R30	ERJ8GCSJ563	Carbon 56K ohms 1/8W
R31,32	ERJ8GCSJ102	Carbon 1K ohms 1/8W
R33	ERJ8GCSJ183	Carbon 18K ohms 1/8W
R34	ERJ8GCSG821	Carbon 820 ohms 1/8W
R35	ERJ8GCSG512	Carbon 5.1K ohms 1/8W
R36	ERJ8GCSJ102	Carbon 1K ohms 1/8W
R37	ERJ8GCSJ563	Carbon 56K ohms 1/8W
R38	ERJ8GCSJ223	Carbon 22K ohms 1/8W
R39	ERJ8GCSJ123	Carbon 12K ohms 1/8W
R40	ERJ8GCSJ185	Carbon 1.8M ohms 1/8W
R41	ERJ8GCSJ473	Carbon 47K ohms 1/8W
R42	ERJ8GCSJ154	Carbon 150K ohms 1/8W
R43	ERJ8GCSJ683	Carbon 68K ohms 1/8W
R44	ERJ8GCSJ223	Carbon 22K ohms 1/8W
R46	ERJ8GCSJ124	Carbon 120K ohms 1/8W
R47	ERJ8GCSJ153	Carbon 15K ohms 1/8W
R48	ERJ8GCSJ103	Carbon 10K ohms 1/8W
R49,50	ERJ8GCSJ102	Carbon 1K ohms 1/8W
R51	ERJ8GCSJ153	Carbon 15K ohms 1/8W
R52	ERJ8GCSJ103	Carbon 10K ohms 1/8W
R53	ERJ8GCSJ431	Carbon 430 ohms 1/8W
R54	ERJ8GCSJ561	Carbon 560 ohms 1/8W
R55	ERJ8GCSJ274	Carbon 270K ohms 1/8W
R56	ERJ8GCSJ222	Carbon 2.2K ohms 1/8W
R57	ERJ8GCSJ102	Carbon 1K ohms 1/8W
R59	ERJ8GCSJ152	Carbon 1.5K ohms 1/8W
R63,64	ERJ8GCSJ333	Carbon 33K ohms 1/8W
R65	ERJ8GCSJ304	Carbon 300K ohms 1/8W
R66	ERJ8GCSJ103	Carbon 10K ohms 1/8W
R70	ERJ8GCSJ223	Carbon 22K ohms 1/8W
R71	ERJ8GCSJ823	Carbon 82K ohms 1/8W
R72	ERJ8GCSJ223	Carbon 22K ohms 1/8W
R73	ERJ8GCSJ472	Carbon 4.7K ohms 1/8W
R74	ERJ8GCSJ185	Carbon 1.8M ohms 1/8W
R75	ERJ8GCSJ563	Carbon 56K ohms 1/8W
R76	ERJ8GCSJ682	Carbon 6.8K ohms 1/8W
R77	ERJ8GCSJ393	Carbon 39K ohms 1/8W
R78	ERJ8GCSJ394	Carbon 390K ohms 1/8W

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SYM-BOL NO.	PART NO.	DESCRIPTION	
R79	ERJ8GCSJ334	Carbon	330K ohms 1/8W
R80	ERJ8GCSJ273	Carbon	27K ohms 1/8W
R81	ERJ8GCSK565	Carbon	5.6M ohms 1/8W
R82	ERJ8GCSK685	Carbon	6.8M ohms 1/8W
R83,84	ERJ8GCSJ473	Carbon	47K ohms 1/8W
R85,86	ERJ8GCSJ244	Carbon	240K ohms 1/8W
R87	ERJ8GCSJ184	Carbon	180K ohms 1/8W
R88	ERJ8GCSJ244	Carbon	240K ohms 1/8W
R89	ERJ8GCSJ223	Carbon	22K ohms 1/8W
R90	ERJ8GCSJ224	Carbon	220K ohms 1/8W
R91	ERJ8GCSJ164	Carbon	160K ohms 1/8W
R92	ERJ8GCSJ224	Carbon	220K ohms 1/8W
R93	ERJ8GCSJ222	Carbon	2.2K ohms 1/8W
R94	ERJ8GCSJ103	Carbon	10K ohms 1/8W
R95	ERJ8GCSJ203	Carbon	20K ohms 1/8W
R96	ERJ8GCSG182	Carbon	1.8K ohms 1/8W
R97	ERJ8GCSG682	Carbon	6.8K ohms 1/8W
R98, 99	ERJ8GCSJ333	Carbon	33K ohms 1/8W
R100	ERJ8GCSJ223	Carbon	22K ohms 1/8W
R101	ERJ8GCSJ681	Carbon	680 ohms 1/8W
R102	ERJ8GCSJ221	Carbon	220 ohms 1/8W
R103	ERJ8GCSJ562	Carbon	5.6K ohms 1/8W
R104	ERJ8GCSJ822	Carbon	8.2K ohms 1/8W
R105	ERJ8GCSJ222	Carbon	2.2K ohms 1/8W
R106	ERJ8GCSJ152	Carbon	1.5K ohms 1/8W
R107	ERJ8GCSJ561	Carbon	560 ohms 1/8W
R108	ERD10TJ472	Carbon	4.7K ohms 1/8W
R109	ERJ8GCSJ153	Carbon	15K ohms 1/8W
R110	ERJ8GCSJ104	Carbon	100K ohms 1/8W
R111	ERJ8GCSJ223	Carbon	22K ohms 1/8W
R112	ERJ8GCSJ103	Carbon	10K ohms 1/8W
R113	ERJ8GCSJ683	Carbon	68K ohms 1/8W
R114	ERJ8GCSJ183	Carbon	18K ohms 1/8W
R115	ERJ8GCSJ562	Carbon	5.6K ohms 1/8W
R116	ERJ8GCSJ751	Carbon	750 ohms 1/8W
R117	ERJ8GCSJ684	Carbon	680K ohms 1/8W
R118	ERJ8GCSJ331	Carbon	330 ohms 1/8W
R119	ERJ8GCSJ561	Carbon	560 ohms 1/8W
R120	ERJ8GCSJ102	Carbon	1K ohms 1/8W
R121	ERJ8GCSJ123	Carbon	12K ohms 1/8W
R122	ERJ8GCSJ122	Carbon	1.2K ohms 1/8W
R123	ERJ8GCSJ184	Carbon	180K ohms 1/8W
R124	ERJ8GCSJ822	Carbon	8.2K ohms 1/8W
R125	ERJ8GCSJ103	Carbon	10K ohms 1/8W
R126	ERJ8GCSG112	Carbon	1.1K ohms 1/8W
R127	ERJ8GCSJ393	Carbon	39K ohms 1/8W
R128	ERJ8GCSJ272	Carbon	2.7K ohms 1/8W
R129	ERJ8GCSJ273	Carbon	27K ohms 1/8W
R130	ERJ8GCSJ102	Carbon	1K ohms 1/8W
R131	ERJ8GCSJ680	Carbon	68 ohms 1/8W
R132	ERJ8GCSJ683	Carbon	68K ohms 1/8W
R133	ERJ8GCSJ223	Carbon	22K ohms 1/8W
R134,135	ERJ8GCSJ471	Carbon	470 ohms 1/8W
R136	ERJ8GCSJ183	Carbon	18K ohms 1/8W
R137	ERJ8GCSJ563	Carbon	56K ohms 1/8W
R138	ERJ8GCSJ222	Carbon	2.2K ohms 1/8W
R139	ERJ8GCSJ392	Carbon	3.9K ohms 1/8W
R140	ERJ8GCSJ472	Carbon	4.7K ohms 1/8W
R141	ERJ8GCSJ103	Carbon	10K ohms 1/8W
R142	ERJ8GCSJ561	Carbon	560 ohms 1/8W
R144	ERJ8GCSJ392	Carbon	3.9K ohms 1/8W
R145	ERJ8GCSJ332	Carbon	3.3K ohms 1/8W
R146	ERJ8GCSJ222	Carbon	2.2K ohms 1/8W
R147,148	ERJ8GCSJ102	Carbon	1K ohms 1/8W
R149	ERJ8GCSJ182	Carbon	1.8K ohms 1/8W
R150	ERJ8GCSJ822	Carbon	8.2K ohms 1/8W
R151	ERJ8GCSJ102	Carbon	1K ohms 1/8W
R152	ERJ8GCSJ152	Carbon	1.5K ohms 1/8W
R153	ERJ8GCSJ102	Carbon	1K ohms 1/8W
R154	ERJ8GCSJ222	Carbon	2.2K ohms 1/8W
R155	ERJ8GCSJ273	Carbon	27K ohms 1/8W
R156	ERJ8GCSJ392	Carbon	3.9K ohms 1/8W
R157	ERJ8GCSJ223	Carbon	22K ohms 1/8W
R159	ERJ8GCSJ333	Carbon	33K ohms 1/8W
R160,161	ERJ8GCSJ102	Carbon	1K ohms 1/8W
R162	ERJ8GCSJ221	Carbon	220 ohms 1/8W
R163	ERJ8GCSJ102	Carbon	1K ohms 1/8W
R164	ERJ8GCSJ150	Carbon	15 ohms 1/8W
R165	ERJ8GCSJ122	Carbon	1.2K ohms 1/8W
R166	ERJ8GCSJ103	Carbon	10K ohms 1/8W
R167	ERJ8GCSJ183	Carbon	18K ohms 1/8W
R168	ERJ8GCSJ332	Carbon	3.3K ohms 1/8W
R170-172	ERJ8GCSJ334	Carbon	330K ohms 1/8W
R173	ERJ8GCSJ472	Carbon	4.7K ohms 1/8W
R174	ERJ8GCSJ622	Carbon	6.2K ohms 1/8W
R175	ERJ8GCSJ334	Carbon	330K ohms 1/8W
R176	ERJ8GCSJ272	Carbon	2.7K ohms 1/8W
R177	ERJ8GCSJ562	Carbon	5.6K ohms 1/8W
R178	ERJ8GCSJ223	Carbon	22K ohms 1/8W
R179	ERJ8GCSJ182	Carbon	1.8K ohms 1/8W
R180,181	ERJ8GCSJ103	Carbon	10K ohms 1/8W
R182	ERJ8GCSJ563	Carbon	56K ohms 1/8W
R183	ERJ8GCSJ222	Carbon	2.2K ohms 1/8W
R184	ERJ8GCSJ472	Carbon	4.7K ohms 1/8W
R185	ERJ8GCSJ223	Carbon	22K ohms 1/8W
R186	ERJ8GCSJ102	Carbon	1K ohms 1/8W
R187	ERJ8GCSJ822	Carbon	8.2K ohms 1/8W
R188,189	ERJ8GCSJ103	Carbon	10K ohms 1/8W
R190,191	ERJ8GCSJ822	Carbon	8.2K ohms 1/8W
R192-194	ERJ8GCSJ103	Carbon	10K ohms 1/8W
R195	ERJ8GCSJ153	Carbon	15K ohms 1/8W
R196	ERJ8GCSJ223	Carbon	22K ohms 1/8W
R197	ERJ8GCSJ103	Carbon	10K ohms 1/8W
R198	ERJ8GCSJ271	Carbon	270 ohms 1/8W
R199	ERJ8GCSJ102	Carbon	1K ohms 1/8W
R201	ERJ8GCSJ102	Carbon	1K ohms 1/8W
R202	ERJ8GCSJ332	Carbon	3.3K ohms 1/8W
R203	ERJ8GCSJ102	Carbon	1K ohms 1/8W
R204	ERJ8GCSJ470	Carbon	47 ohms 1/8W
R205	ERJ8GCSJ103	Carbon	10K ohms 1/8W
R207	ERJ8GCSJ303	Carbon	30K ohms 1/8W
R208	ERJ8GCSJ153	Carbon	15K ohms 1/8W

SYMBOL NO.	PART NO.	DESCRIPTION	
R209	ERJ8GCSJ392	Carbon	3.9K ohms 1/8W
R210	ERJ8GCSJ333	Carbon	33K ohms 1/8W
R211,212	ERJ8GCSJ222	Carbon	2.2K ohms 1/8W
R213	ERJ8GCSJ103	Carbon	10K ohms 1/8W
R214	ERJ8GCSJ333	Carbon	33K ohms 1/8W
R215	ERD10TJ103	Carbon	10K ohms 1/8W
R216	ERD10TJ153	Carbon	15K ohms 1/8W
R217	ERJ8GCSJ182	Carbon	1.8K ohms 1/8W
R218	ERJ8GCSJ683	Carbon	68K ohms 1/8W
R219	ERJ8GCSJ103	Carbon	10K ohms 1/8W
VR1	YWH0651A22K	Variable Resistor	22K ohms
VR2,3	YWH0651A10K	Variable Resistor	10K ohms
VR4	YWH0651A3R3K	Variable Resistor	3.3K ohms
VR5	YWH0651A2R2K	Variable Resistor	2.2K ohms
VR12	YWH0651A10K	Variable Resistor	10K ohms
VR13	YWH0651A470	Variable Resistor	470 ohms
VR14	YFH0621A680X	Variable Resistor	680 ohms
VR15	YWH0651A1K	Variable Resistor	1K ohms
VR16	YFH0521A10K	Variable Resistor	10K ohms
VR17	YWH0651A2R2K	Variable Resistor	2.2K ohms
VR18	YWH0651A3R3K	Variable Resistor	3.3K ohms
VR19	YFH0521A2R2K	Variable Resistor	2.2K ohms
BVR1, 2	YFH1622001	Block Variable Resistor	
C1	ECEA1ASS470	Electrolytic	47 μF 10V
C2,3	YF426681SLKS	Ceramic	680 pF 50V
C4	ECEA1ASS330	Electrolytic	33 μF 10V
C5	ECEA10Z47	Electrolytic	47 μF 10V
C6	YF426270CHJS	Ceramic	27 pF 50V
C7	YF426681SLKS	Ceramic	680 pF 50V
C9	YF426104XKS	Ceramic	0.1 μF 50V
C10	ECEA1ASS220	Electrolytic	22 μF 10V
C11	ECEA1ASS470	Electrolytic	47 μF 10V
C12	ECEA1ASS470	Electrolytic	47 μF 10V
C13	YF426330CHJS	Ceramic	33 pF 50V
C14	ECEA1ASS470	Electrolytic	47 μF 10V
C15	ECEA1HSS010	Electrolytic	1 μF 50V
C16	YF426473XMS	Ceramic	0.047 μF 50V
C17	ECEA1VSS4R7	Electrolytic	4.7 μF 35V
C18	ECEA1CSS100	Electrolytic	10 μF 16V
C19	ECEA1ASS470	Electrolytic	47 μF 10V
C20	ECEA1ASS220	Electrolytic	22 μF 10V
C21,22	ECEA1ASS470	Electrolytic	47 μF 10V
C23,24	YF426473XMS	Ceramic	0.047 μF 50V
C25	YF426330CHJS	Ceramic	33 pF 50V
C26	ECEA1ASS470	Electrolytic	47 μF 10V
C27	YF426222XMS	Ceramic	2200 pF 50V
C28	YF426330CHJS	Ceramic	33 pF 50V
C29	ECEA1ASS470	Electrolytic	47 μF 10V
C30-32	ECEA1HSS3R3	Electrolytic	3.3 μF 50V
C33	ECEA1ASS470	Electrolytic	47 μF 10V
C34-36	YF426104DMS	Ceramic	0.1 μF 50V
C38	YF426221SLKS	Ceramic	220 pF 50V
C39	YF426473XMS	Ceramic	0.047 μF 50V
C40,41	YF426221SLKS	Ceramic	220 pF 50V
C42	YF426473XMS	Ceramic	0.047 μF 50V
C43	YF426471SLKS	Ceramic	470 pF 50V

SYMBOL NO.	PART NO.	DESCRIPTION	
C44	ECEA1ASS470	Electrolytic	47 μF 10V
C45	YF426470SLKS	Ceramic	47 pF 50V
C46	ECEA1HSS010	Electrolytic	1 μF 50V
C47	YF426473XMS	Ceramic	0.047 μF 50V
C48	YF426104DMS	Ceramic	0.1 μF 50V
C49	YF426473XMS	Ceramic	0.047 μF 50V
C50	YF426681SLKS	Ceramic	680 pF 50V
C51	ECEA1ASS220	Electrolytic	22 μF 10V
C52	YF426121CHJS	Ceramic	120 pF 50V
C53	YF426222XKS	Ceramic	2200 pF 50V
C54	ECEA0JSS471	Electrolytic	470 μF 6.3V
C55	ECEA1ASS470	Electrolytic	47 μF 10V
C56	YF426680CHJS	Ceramic	68 pF 50V
C57	ECEA1ASS470	Electrolytic	47 μF 10V
C58	YF426222XMS	Ceramic	2200 pF 50V
C59	ECEA1CSS100	Electrolytic	10 μF 16V
C60,61	YF426473XMS	Ceramic	0.047 μF 50V
C62	YF426681SLKS	Ceramic	680 pF 50V
C63	YF426221SLKS	Ceramic	220 pF 50V
C64	YF426220SLKS	Ceramic	22 pF 50V
C65	YF426100CHDS	Ceramic	10 pF 50V
C66-68	YF426473XMS	Ceramic	0.047 μF 50V
C69,70	YF426222XMS	Ceramic	2200 pF 50V
C71	ECEA1ASS470	Electrolytic	47 μF 10V
C72	ECEA1ASS470	Electrolytic	47 μF 10V
C73	YF426681SLKS	Ceramic	680 pF 50V
C74	YF426473XMS	Ceramic	0.047 μF 50V
C75	YF426681SLKS	Ceramic	680 pF 50V
C76	YF426102XMS	Ceramic	1000 pF 50V
C77	ECEA1ASS470	Electrolytic	47 μF 10V
C78	YF426221SLKS	Ceramic	220 pF 50V
C79	YF426270CHJS	Ceramic	27 pF 50V
C80	YF426070CHDS	Ceramic	7 pF 50V
C81	YF426820CHJS	Ceramic	82 pF 50V
C82	YF426680CHJS	Ceramic	68 pF 50V
C83	YF426471SLKS	Ceramic	470 pF 50V
C84	YF426473XMS	Ceramic	0.047 μF 50V
C85	YF426271SLJS	Ceramic	270 pF 50V
C86	ECEA1ASS470	Electrolytic	47 μF 10V
C87	ECEA1ASS470	Electrolytic	47 μF 10V
C88	YF426104XKS	Ceramic	0.1 μF 50V
C89	YF426270CHJS	Ceramic	27 pF 50V
C90	YF426221SLKS	Ceramic	220 pF 50V
C91	ECEA1ASS470	Electrolytic	47 μF 10V
C92	YF426473XMS	Ceramic	0.047 μF 50V
C93	YF426470SLKS	Ceramic	47 pF 50V
C94	YF426181SLJS	Ceramic	180 pF 50V
C95	YF426101CHJS	Ceramic	100 pF 50V
C96,97	YF426102XMS	Ceramic	1000 pF 50V
C100	ECEA1HSSR47	Electrolytic	4.7 μF 50V
C101	YF426472XMS	Ceramic	4700 pF 50V
C102	YF426181SLJS	Ceramic	180 pF 50V
C103	YF426102XMS	Ceramic	1000 pF 50V
C104	YF426223XKS	Ceramic	0.022 μF 50V
C105	YF426472XMS	Ceramic	4700 pF 50V
C106	YF426221SLKS	Ceramic	220 pF 50V

SYMBOL NO.	PART NO.	DESCRIPTION
CT1	ECRHA070M11	Trimmer Capacitor 70 pF
CT2	ECRHA030E11	Trimmer Capacitor 30 pF
CT3	ECRHA070M11	Trimmer Capacitor 70 pF
CT4	ECRHA030E11	Trimmer Capacitor 30 pF
CT5	CTC6U020	Trimmer Capacitor 20 pF
DL1	EFDMT645K55A	Delay Line
DL2	EFDVN645B05A	Delay Line
L1	YWL5181J	Coil 180 mH
L2	YFEL05SI8R2K	Coil 8.2 μH
L3-5	YWL58R2J	Coil 8.2 μH
L6	YFEL05SI8R2K	Coil 8.2 μH
L7	YFL5151J	Coil 150 μH
L8,9	YWL5270J	Coil 27 μH
L10	YFEL05SI8R2K	Coil 8.2 μH
L11	YWL52R2J	Coil 2.2 μH
L12	YWL5271J	Coil 270 mH
SW1	YWSSS21200	Slide Switch
X1	YFMS30914R3M	Crystal Oscillator
CF1	YFELB5A006	Filter
CF2	YFSLC871090	Filter
CF3	YFSLC861102	Filter
CF4	YFSLC841104	Filter
CF5	YFSLC861106A	Filter
CF6	YFELB5A005	Filter
CF7	YFSLC851091	Filter
CF8	ELB5E044	Filter
CF9	YFELB5A006	Filter
CF10	YFSLC008	Filter
J1-9	ERJ8GCSJ0R00	Jumper Resistor
J10	ERD25TC0	Jumper Resistor
CN1-JM	EMCS0350Z	3 pin Jack Male
CN2-JM	EMCS0350Z	3 pin Jack Male
CN3-JM	EMCS0650Z	6 pin Jack Male
CN4-JM	EMCS0350Z	3 pin Jack Male
CN5-JM	EMCS0750Z	7 pin Jack Male
CN6-JM	EMCS0550Z	5 pin Jack Male
CN7	YF742J2547	7 pin Flat Cable for E3 (Deflection)
CN8	YF742J25410	10 pin Flat Cable for E2 (Deflection)
CN9-JM	EMCS0250Z	2 pin Jack Male
CN10	YFICS6412663	IC Socket
BI1	EMCZ0911D03V	9 pin Connecting Wire Ass y for BI1 and CN6 (Micro Processor)
BI2	EMCZ0711D01V	7 pin Connecting Wire Ass y for BI2 and CN8 (Micro Processor)
BI3	EMCZ1011D01V	10 pin Connecting Wire Ass y for BI3 and CN7 (Micro Processor)
M64	YFV2HA0084A3	Shield Case B
M65	YFV2HA0102A4	Shield Cover C

YFVKY3230P4A
MICRO PROCESSOR BOARD

SYMBOL NO.	PART NO.	DESCRIPTION
PCB004	* YFVKY3230P4A	Printed Circuit Board Assembly
IC1	MN1237B	IC

SYMBOL NO.	PART NO.	DESCRIPTION	
IC2	MN1554CVA	IC	
IC3,4	AN90B82S	IC	
Q1	2SC2404-CD	Transistor	
Q2	2SB709-QRS	Transistor	
Q3-8	2SD601-QRS	Transistor	
Q9	2SB814-QRS	Transistor	
Q10	2SA1022-CD	Transistor	
Q11	2SC2404-CD	Transistor	
Q12	2SB709-QRS	Transistor	
Q13	2SD602-QRS	Transistor	
Q14	2SD601-QRS	Transistor	
Q15	2SB709-QRS	Transistor	
Q16	2SD601-QRS	Transistor	
Q17	2SB709-QRS	Transistor	
Q18,19	2SD601-QRS	Transistor	
Q20	2SB709-QRS	Transistor	
Q21	2SD601-QRS	Transistor	
D1-11	MA151K	Diode	
D12	MA151K	Diode	
R1	ERJ8GCSJ273	Carbon	27K ohms 1/8W
R2	ERD10TJ223	Carbon	22K ohms 1/8W
R3	ERJ8GCSJ224	Carbon	220K ohms 1/8W
R4	ERJ8GCSJ114	Carbon	110K ohms 1/8W
R5	ERJ8GCSG753	Carbon	75K ohms 1/8W
R6	ERJ8GCSJ562	Carbon	5.6K ohms 1/8W
R7	ERJ8GCSJ103	Carbon	10K ohms 1/8W
R8	ERJ8GCSJ682	Carbon	6.8K ohms 1/8W
R9	ERJ8GCSJ222	Carbon	2.2K ohms 1/8W
R10	ERJ8GCSJ473	Carbon	47K ohms 1/8W
R12	ERJ8GCSJ103	Carbon	10K ohms 1/8W
R13	ERJ8GCSJ473	Carbon	47K ohms 1/8W
R14	ERJ8GCSJ222	Carbon	2.2K ohms 1/8W
R15	ERJ8GCSJ473	Carbon	47K ohms 1/8W
R16	ERJ8GCSJ223	Carbon	22K ohms 1/8W
R17	ERJ8GCSJ103	Carbon	10K ohms 1/8W
R18,19	ERJ8GCSJ153	Carbon	15K ohms 1/8W
R20	ERJ8GCSJ222	Carbon	2.2K ohms 1/8W
R21	ERJ8GCSJ103	Carbon	10K ohms 1/8W
R22	ERJ8GCSJ472	Carbon	4.7K ohms 1/8W
R23	ERJ8GCSJ562	Carbon	5.6K ohms 1/8W
R24	ERJ8GCSK106	Carbon	10M ohms 1/8W
R25	ERJ8GCSJ474	Carbon	470K ohms 1/8W
R26	ERJ8GCSJ223	Carbon	22K ohms 1/8W
R27	ERJ8GCSJ103	Carbon	10K ohms 1/8W
R29	ERD10TJ334	Carbon	330K ohms 1/8W
R30	ERJ8GCSJ102	Carbon	1K ohms 1/8W
R31	ERJ8GCSJ222	Carbon	2.2K ohms 1/8W
R32	ERJ8GCSJ103	Carbon	10K ohms 1/8W
R33	ERJ8GCSJ222	Carbon	2.2K ohms 1/8W
R34	ERJ8GCSJ331	Carbon	330 ohms 1/8W
R35-37	ERJ8GCSJ103	Carbon	10K ohms 1/8W
R38	ERJ8GCSJ224	Carbon	220K ohms 1/8W
R40,41	ERJ8GCSJ473	Carbon	47K ohms 1/8W
R42-45	ERJ8GCSJ103	Carbon	10K ohms 1/8W
R46	ERJ8GCSJ473	Carbon	47K ohms 1/8W
R47	ERJ8GCSJ223	Carbon	22K ohms 1/8W

SYM-BOL NO.	PART NO.	DESCRIPTION	
R48-51	ERJ8GCSJ103	Carbon	10K ohms 1/8W
R52	ERJ8GCSJ473	Carbon	47K ohms 1/8W
R53	ERJ8GCSJ222	Carbon	2.2K ohms 1/8W
R54,55	ERJ8GCSJ103	Carbon	10K ohms 1/8W
R59	ERJ8GCSJ331	Carbon	330 ohms 1/8W
R60	ERJ8GCSJ101	Carbon	100 ohms 1/8W
R61	ERD10TJ223	Carbon	22K ohms 1/8W
VR1	YFH0621A2R2K	Variable Resistor	2.2K ohms
BVR1	EXBLD6154GU	Block Resistor	
BVR2,3	EXBEQ6822J	Block Resistor	
BVR4	EXBLD6154GU	Block Resistor	
BVR5	EXBEQ8683J	Block Resistor	
C1	ECEA1CSS100	Electrolytic	10 µF 16V
C2	YF426390CHJS	Ceramic	39 pF 50V
C3	YF426470SLKS	Ceramic	47 pF 50V
C4	YF426221SLKS	Ceramic	220 pF 50V
C5	YF426470SLKS	Ceramic	47 pF 50V
C6	ECEA0JSS221	Electrolytic	220 µF 6.3V
C7	YF426104DMS	Ceramic	0.1 µF 50V
C8	YF426270CHJS	Ceramic	27 pF 50V
C9,10	YF426330CHJS	Ceramic	33 pF 50V
C11	ECEA0JSS470	Electrolytic	47 µF 6.3V
C12,13	ECEA1CSS100	Electrolytic	10 µF 16V
C14	ECEA0JF470	Electrolytic	47 µF 6.3V
C15	YF426121SLKS	Ceramic	120 pF 50V
C16	YF426471SLKS	Ceramic	470 pF 50V
C19	ECEA1CSS100	Electrolytic	10 µF 16V
C20,21	ECSF1AE475	Electrolytic	4.7 µF 10V
CT1	CTC6S040	Trimmer Capacitor	
L1	YWL5101JA	Coil	100 µH
L2	LAL03NA8R2K	Coil	8.2 µH
X1	YFKF38G	Crystal Oscillator	
X2	KBR4R0M7	Crystal Oscillator	
J20	ERD25TC0	Jumper Resistor	
CN1	YF742J28	8 pin Connector for Flat Cable	
CN2	YFHBLB11S1J	11 pin connector for Flat Cable	
CN3-JM	EMCS0350Z	3 pin Jack Male	
CN4-JM	EMCS0250Z	2 pin Jack Male	
CN5-JM	EMCS0250Z	2 pin Jack Male	
CN6-JM	EMCS0950Z	9 pin Jack Male	
CN7-JM	EMCS1050Z	10 pin Jack Male	
CN8-JM	EMCS0750Z	7 pin Jack Male	
BI1	EMCZ1014D02V	10 pin connecting Wire Ass y for BI1 and CN6 (Deflection)	

YFVPKA0714JA
MICRO PROCESSOR SUBBOARD

PCB005	* YFVPKA0714JA	Printed Circuit Board Assembly
Q101-103	2SB709-QRS	Transistor
Q104	2SD601-QRS	Transistor
Q105	2SD1030RST	Transistor
Q106	2SB709-QRS	Transistor

SYM-BOL NO.	PART NO.	DESCRIPTION	
R101	ERJ8GCSJ562	Carbon	5.6K ohms 1/8W
R102	ERJ8GCSJ683	Carbon	68K ohms 1/8W
R103	ERJ8GCSJ104	Carbon	100K ohms 1/8W
R104	ERJ8GCSJ563	Carbon	56K ohms 1/8W
R105	ERJ8GCSJ223	Carbon	22K ohms 1/8W
R106,107	ERJ8GCSJ103	Carbon	10K ohms 1/8W
R108,109	ERJ8GCSJ223	Carbon	22K ohms 1/8W
R110	ERJ8GCSJ104	Carbon	100K ohms 1/8W
R111	ERJ8GCSJ103	Carbon	10K ohms 1/8W
C1	ECEA1EK4R7	Electrolytic	4.7 µF 25V
C2	YF426271CHJS	Ceramic	270 pF 50V

YFVAKA0166AN
STANDBY BOARD

PCB006	* YFVAKA0166AN	Printed Circuit Board Assembly	
Q1	2SB793-QRS	Transistor	
Q2	2SD636-QRS	Transistor	
D1	MA165	Diode	
D2	YFLN11WP23F	LED	
R1	ERD10TJ272	Carbon	2.7K ohms 1/8W
R2	ERD10TJ103	Carbon	10K ohms 1/8W
R3	ERD10TJ332	Carbon	3.3K ohms 1/8W
R4	ERD10TJ2R7	Carbon	2.7 ohms 1/8W
R5	ERD10TJ681	Carbon	680 ohms 1/8W
R6	ERD10TJ223	Carbon	22K ohms 1/8W
R7	ERD10TJ241	Carbon	240 ohms 1/8W
R8	ERD10TJ161	Carbon	160 ohms 1/8W
R9	ERD10TJ271	Carbon	270 ohms 1/8W
R10	ERD10TJ563	Carbon	56K ohms 1/8W
R11	ERD10TJ223	Carbon	22K ohms 1/8W
VR1	EVJLCA307B34	Variable Resistor	30K ohms
VR2	EVJLCA307B14	Variable Resistor	10K ohms
SW1	KEG10903	Push Switch	
SW2	YFSSY023L6N	Slide Switch	
BI1	EMCZ0510D02V	5 pin Connecting Wire Ass y for BI1 and CN6 (Process)	
BI2	EMCZ0614D02V	6 pin Connecting Wire Ass y for BI2 and CN1 (Deflection)	
M17	* YFV5EC0119A3	Right Bottom Cover	
M67	* YFV5RA0027A4	Standby Switch Knob	
M68	* YFV5RA0029A4	REC Review Knob	
M69	* YFV5RA0038A4	Auto Iris/Balance Regulation Knob	

YFVKY3230P5A
AUDIO/LENS CONTROL BOARD

PCB007	* YFVKY3230P5A	Printed Circuit Board Assembly
IC1	NJM3414M	IC

SYM-BOL NO.	PART NO.	DESCRIPTION	
IC2	NJM4558MD	IC	
IC3	NJM3415M	IC	
Q1-4	2SB709-QRS	Transistor	
Q5	2SC2405ST	Transistor	
Q6,7	2SC2405STU	Transistor	
Q8	2SB709-QRS	Transistor	
D1	MA151K	Diode	
D2	MA153	Diode	
D4,7	MA151K	Diode	
D8	MA151K	Diode	
R1	ERJ8GCSJ223	Carbon	22K ohms 1/8W
R2	ERJ8GCSJ104	Carbon	100K ohms 1/8W
R3	ERJ8GCSJ154	Carbon	150K ohms 1/8W
R4	ERJ8GCSJ333	Carbon	33K ohms 1/8W
R5	ERJ8GCSJ102	Carbon	1K ohms 1/8W
R6	ERJ8GCSJ222	Carbon	2.2K ohms 1/8W
R7	ERJ8GCSJ103	Carbon	10K ohms 1/8W
R8	ERJ8GCSG752	Carbon	7.5K ohms 1/8W
R9,10	ERJ8GCSJ103	Carbon	10K ohms 1/8W
R11	ERJ8GCSG752	Carbon	7.5K ohms 1/8W
R14	ERJ8GCSJ470	Carbon	47 ohms 1/8W
R15	ERJ8GCSJ223	Carbon	22K ohms 1/8W
R16	ERJ8GCSJ103	Carbon	10K ohms 1/8W
R17	ERJ8GCSJ104	Carbon	100K ohms 1/8W
R18	ERJ8GCS434	Carbon	430K ohms 1/8W
R19	ERJ8GCSJ334	Carbon	330K ohms 1/8W
R20	ERJ8GCSJ152	Carbon	1.5K ohms 1/8W
R21	ERJ8GCSJ331	Carbon	330 ohms 1/8W
R22	ERJ8GCSJ102	Carbon	1K ohms 1/8W
R23	ERJ8GCSJ134	Carbon	130K ohms 1/8W
R25	ERJ8GCSG182	Carbon	1.8K ohms 1/8W
R26	ERJ8GCSG102	Carbon	1K ohms 1/8W
R27	ERJ8GCSJ101	Carbon	100 ohms 1/8W
R29	ERJ8GCSJ102	Carbon	1K ohms 1/8W
R30	ERJ8GCSK8R2	Carbon	8.2 ohms 1/8W
R31	ERJ8GCSJ223	Carbon	22K ohms 1/8W
R32	ERJ8GCSJ103	Carbon	10K ohms 1/8W
R33	ERJ8GCSJ152	Carbon	1.5K ohms 1/8W
R34	ERJ8GCSJ331	Carbon	330 ohms 1/8W
R35	ERJ8GCSJ102	Carbon	1K ohms 1/8W
R36	ERJ8GCSJ134	Carbon	130K ohms 1/8W
R38	ERJ8GCSJ102	Carbon	1K ohms 1/8W
R39	ERJ8GCSK8R2	Carbon	8.2 ohms 1/8W
R41	ERJ8GCSJ122	Carbon	1.2K ohms 1/8W
R42,43	ERJ8GCSJ472	Carbon	4.7K ohms 1/8W
R44,45	ERJ8GCSJ681	Carbon	680 ohms 1/8W
R46,47	ERJ8GCSJ822	Carbon	8.2K ohms 1/8W
C1	YF426104DMS	Ceramic	0.1 μF 50V
C2	YF426271SLJS	Ceramic	270 pF 50V
C3	ECEA1ASS470	Electrolytic	47 μF 10V
C4	YF426473XMS	Ceramic	0.047 μF 50V
C5,6	ECEA0JU101	Electrolytic	100 μF 6.3V
C7	ECQM1H223JZ	Plastic	0.022 μF
C8	YF426103XMS	Ceramic	10000 pF 50V
C9	ECEA1ASS470	Electrolytic	47 μF 10V
C10	ECEA1CSS100	Electrolytic	10 μF 16V

SYM-BOL NO.	PART NO.	DESCRIPTION	
C11	ECEA0JU331	Electrolytic	330 μF 6.3V
C12	ECEA1HSS010	Electrolytic	1 μF 50V
C13	YF426151CHJS	Ceramic	150 pF 50V
C14	ECEA1AU101	Electrolytic	100 μF 10V
C16	ECEA1HSSR47	Electrolytic	0.47 μF 50V
C17	ECEA1ASS470	Electrolytic	47 μF 10V
C18	ECQM1H223JZ	Plastic	0.022 μF
C19	YF426103XMS	Ceramic	10000 pF 50V
C20	ECEA1ASS470	Electrolytic	47 μF 10V
C21	ECEA1CSS100	Electrolytic	10 μF 16V
C22	ECEA1HSS010	Electrolytic	1 μF 50V
C23	YF426151CHJS	Ceramic	150 pF 50V
C24	ECEA1HNR47S	Electrolytic	0.47 μF 50V
C25	ECEA1ASS470	Electrolytic	47 μF 10V
C26	YF426104DMS	Ceramic	0.1 μF 50V
C27,28	YF426472XKS	Ceramic	4700 pF 50V
C29,30	YF426473XMS	Ceramic	0.047 μF 50V
J1-8	ERJ8GCSJ0R00	Jumper Resistor	
CN1-JM	EMCS1050Z	10 pin Jack Male	
CN2-JM	EMCS0550Z	5 pin Jack Male	
CN3-JM	EMCS0250Z	2 pin Jack Male	
CN4-8-JM	EMCS0350Z	3 pin Jack Male	
BI1	EMCZ0614D01V	6 pin Connecting Wire Ass y for BI1 and CN3 (Process)	
BI2	EMCZ0516D01V	5 pin Connecting Wire Ass y for BI2 and CN7 (Process)	

YFVAKA0170AN
DISPLAY KEY BOARD A

PCB008	* YFVAKA0170AN	Printed Circuit Board Assembly

YFVAKA0169AN
DISPLAY KEY BOARD B

PCB009	* YFVAKA0169AN	Printed Circuit Board Assembly

YFVKZ3230PBA
INT MIC BOARD

PCB010	* YFVKZ3230PBA	Printed Circuit Board Assembly
JK1	YFM0JB19M	Mic Jack

SYM-BOL NO.	PART NO.	DESCRIPTION
CN6-PF	EMCZ0314C01	3 pin Plug Female for Audio/Lens Control Board
M54	YFV2SA0089A4	Mounting Angle

YFVKZ3230PAA
EXT MIC BOARD

PCB011	* YFVKZ3230PAA	Printed Circuit Board Assembly
JK1,2	YFM0JB21M	Jack
CN5-PF	EMCZ0316C01	3 pin Plug Female for Audio/Lens Control Board
CN4-PF	EMCZ0317C01	3 pin Plug Female for Audio/Lens Control Board

YFVAKA0136AN
EARPHONE BOARD

PCB012	* YFVAKA0136AN	Printed Circuit Board Assembly
JK1	YFM0JB19M	Earphone Jack
CN8-PF	EMCZ0310C01	3 pin Plug Female for Audio/Lens Control Board

YFVAKA0167AN
GRIP ASSEMBLY

CN1-PF	EMCUSA20D04	10 pin Plug Female for Audio/Lens Control Board (CN107)
CN4-PF	EMCZ0248D02	2 pin Plug Female for Deflection Board
M71	* YFV7SA0083AS	Grip Arm Ass y for Left Side
M72	* YFV4AC0008A2	Grip Arm for Right Side
M73	* YFV4EA0003A4	Gear for Round Stopper
M74	* YFV2VA0011A4	Barrier for Reinforce Plate
M75	YWCC702LR01	Cord Clamp
M76	YFV4JA0008A4	Lock Spring
M77	YFV5RA0010A4	Lock Knob
M78	* YFV5RA0035A4	Slide Knob
M79	* YFV5RA0034B4	Fade Knob
M80	* YFV2TA0028B4	Mounting Bracket A for Grip Band
M81	YFV5YA0006A3	Grip Band
M82	* YFV2TA0030A4	Mounting Bracket B for Grip Band
M83	YFV5JA0004B2	Cover for Left
M84	* YFV5JA0005B2	Cover for Right
M85	YFV5KA0030B3	Battery Case
M86	* YFV1EA0022A4	Special Screw for Battery Case
M87	* YFV2TA0027B3	Mounting Base for Grip Arm

SYM-BOL NO.	PART NO.	DESCRIPTION
M88	* YFV1HA0010AS	Mounting Pin Ass y
M90	YFV4JA0007A4	Coil Spring
M92	* YFV6JA0015A3	Button for Zoom Switch
M93	* YFV4JA0052A4	Spring for - Battery Polarity
M94	* YFV4JA0053A4	Spring for + Battery Polarity
M95	YFV6JA0013A4	Button for Reck Switch
M98	* YFV4JA0054A4	Coil Spring for Battery Case
M99	YFV2NA0026A4	Spacer

YWV3100ZK07
REC SWITCH BOARD

PCB013	YWV3100ZK07	Printed Circuit Board Assembly
SW701	KEC10902	Push Switch

YFVPKA0709JA
ZOOM SWITCH BOARD

PCB014	* YFVPKA0709JA	Printed Circuit Board Assembly
SW1, 2	KEG10904	Zoom Push Switch
CN3-PF	EMCZ0240D01	2 pin Plug Female for Audio/Lens Control Board
M96	YFV5KA0029A3	Zoom Case
M97	YFV2FA0013B4	Zoom Switch Rubber Cushion (x2)

YFVKZ3230P8A
FADE/AGC SWITCH BOARD

PCB015	* YFVKZ3230P8A	Printed Circuit Board Assembly
R1	ERD10TJ432	Carbon 4.3K ohms 1/8W
R2	ERD10TJ911	Carbon 910 ohms 1/8W
SW1	YFSSJ342L4M	Slide Switch
SW2	KEC10903	Push Switch
SW3, 4	YWSSS322	Slide Switch
BI1	EMCL323D01	3 pin Connecting Wire Ass y for BI1 and REC Board
BI2	EMCZ0723D02V	7 pin Connecting Wire Ass y for BI2 and CN5 (Process)
BI3	EMCZ0320D01V	3 pin Connecting Wire Ass y for BI3 and CN3 (Micro Processor)

WM-4034 MICROPHONE ASSEMBLY

SYMBOL NO.	PART NO.	DESCRIPTION
M111	* YFWM4034UNIT	Mic Unit
M112	* YFMLKA0091B4	Mic Cable Ass y
M113	* YWM6CA0009A4	Wind Screen
M114	* YFWM4034CASE	Head Case Ass y
M115	* YWM5KA0181A3	Case
M116	* YPM-MG165AA4	Cord Clamp Cushion
M117	* YWM5UA0004B4	Pipe

YFVAKA0165AN MISCELLANEOUS

SYMBOL NO.	PART NO.	DESCRIPTION
CRT101 ⚠	40JB4	Cathode Ray Tube
L102	ELY15V202A	Deflection Coil Ass y
CN102	E8130J600	8 pin EVF Connector Ass y for CN102 and CN1-PF
CN104	YFS7506P70S	CRT Socket Ass y
M120	* YFV5ED0127A2	EVF Upper Cover
M121	* YFV5EC0128A2	EVF Bottom Cover
M122 ⚠	* YFV7MA0059AS	CRT Upper Cover
M123 ⚠	* YFV7MA0049AS	CRT Bottom Cover
M124	YFV5MA0002A4	Shoe
M125	YWCC704WM07	Spring for Shoe
M126	* YFV2TA0031A4	Mounting Bracket for Shoulder Belt
M127	YFV1FA0005A4	Nut
M128	YFV4JA0049A4	Spring Plate C for CRT Revolution Stop
M129	YWCC704AM03C	Hold Plate for Shoe
M130	YFV4JA0046A4	Spring Plate A for Open and Shut
M131	* YFV3CB0031A3	EVF Lens Holder
M132	YFV1VA0008A4	Lens
M133	YFV5GA0019A4	Eye Cap
M134	YFV2FA0053A4	Cushion
M135	YFV2FA0049B4	Cushion for CRT (x2)
M137	YFV2VA0010A4	Barrier for CRT
M138	YFV1UA0004A4	EVF Mirror
M139	YFV4JA0048A4	Spring Plate B for Hold Mirror
M141	YWCC704FM02	Special Screw for Shoe
M142	YFV2FA0014B4	Cushion
M143	YFV5RA0033BS	Lock Lever Ass y

YFVPKA0706JB EVF BOARD

SYMBOL NO.	PART NO.	DESCRIPTION	
PCB016	* YFVPKA0706JB	Printed Circuit Board Assembly	
Q1 ⚠	2SD1083	Transistor	
Q2	2SB642-QRS	Transistor	
D1	MA165	Diode	
R1	ERD25FJ565	Carbon	5.6M ohms 1/4W
R2	ERD25FJ275	Carbon	2.7M ohms 1/4W
R3	ERD10TJ105	Carbon	1M ohms 1/8W
R4	ERD10TJ223	Carbon	22K ohms 1/8W
R6	ERD10TJ101	Carbon	100 ohms 1/8W
R7	ERD10TJ222	Carbon	2.2K ohms 1/8W
R8	ERD10TJ103	Carbon	10K ohms 1/8W
R9	ERD10TJ822	Carbon	8.2K ohms 1/8W
R10	ERD10TJ472	Carbon	4.7K ohms 1/8W
VR1	EVM45GA00BV6	Variable Resistor	5.6M ohms
VR2	YWH0651A1M	Variable Resistor	1M ohms
VR3	YWH0651A4R7K	Variable Resistor	4.7K ohms
C1,2	YFDE905B152K	Ceramic	1500 pF 50V
C3	ECQV05823JZ	Plastic	0.082 µF 50V
C4	ECCF1H181J	Ceramic	180 pF
C5	ECEA1HSS010	Electrolytic	1 µF 50V
C6	ECEA1ASS470	Electrolytic	47 µF 10V
C7	ECEA1ASS221	Electrolytic	220 µF 10V
C8 ⚠	ECQP1562JZ	Plastic	5600 pF 100V
C9	ECEA10Z100	Electrolytic	100 µF 10V
C10	ECEA1ASS470	Electrolytic	47 µF 10V
C11	ECEA1ASS470	Electrolytic	47 µF 10V
L1	YFVC101J	Coil	100 µH
L2	ELH5L62	Coil	
L3	YFSIZE201	Coil	
T1 ⚠	YFHIPAKEVF70	Flyback Transformer	
CN1-JM	EMCS0450Z	4 pin Jack Male	
CN2-JM	EMCS0850Z	8 pin Jack Male	

YFUAF-82 AUTO FOCUS LENS UNIT

SYMBOL NO.	PART NO.	DESCRIPTION
S101	* YFES905-12	Focus Ring Position Sensor
CN107	* YF509066	12 pin Connector Wire Ass'y
M151	* YFES052-08	AF Bottom Cover
M152	* YFES052-09	AF Upper Cover
M153	* YFES052-10	AF Front Cover
M154	* YFES110-15	AF Lens chassis
M156	* YFES113-06	Sensor Shield Cover
M157	* YFES800-25	Insulator Plate
M159	* YF509232	Iris Cover
M160	* YF509242	Lens Hood Cap
	*	
M161	* YF509241	Lens Hood
M162	* YF509237	Focus Band
M163	* YF509256	Zoom Focus Motor Ass'y
M164	* YF509255	Focus Gear Ass'y
M165	* YF509061	Focus Gear Holder Ass'y
M166	* YF509075	Zoom Lever
M167	* YF509073	Lens Mounting Ass'y
M168	* YF509058	ALC Ass'y
M170	* YF509233	Switch Cover
M171	* YF509101	Auto Switch Ass'y
M172	* YF509055	Push Button
M173	* YF509046	Switch Board Ass'y

YFES950-43A
AUTO FOCUS BOARD-A

SYMBOL NO.	PART NO.	DESCRIPTION	
PCB021	*YFES950-43A	Printed circuit Board Assembly	
IC001	YFSS514-77	IC	
IC005	NJM78L05A	IC	
Q011	2SC2603	Transistor	
Q012	2SA1115	Transistor	
Q013, 014	2SC2603	Transistor	
Q015	2SD965	Transistor	
Q016	2SA720	Transistor	
Q017	2SD965	Transistor	
Q018	2SA720	Transistor	
Q019	2SD965	Transistor	
Q020-25	2SC2603	Transistor	
X002	YFSS514-48	Crystal	400 KHz
D012	1N4002	Diode	
D013	MZ305	Diode	
D014	MA165	Diode	
R033	YFSC049-64	Carbon	22 K ohm 1/6W
R034	YFSC049-74	Carbon	560K ohms 1/6W
R035-038	YFSC049-64	Carbon	22K ohms 1/6W
R039	YFSC049-59	Carbon	4.7K ohms 1/6W
R040	YFSC049-55	Carbon	270 ohms 1/6W
R041	YFSC049-78	Carbon	4.7 ohms 1/6W
R042	YFSC049-64	Carbon	22K ohms 1/6W
R043	YFSC049-58	Carbon	2.2K ohms 1/6W
R044	YFSC049-59	Carbon	4.7K ohms 1/6W
R045	YFSC049-56	Carbon	1K ohms 1/6W
R046	YFSC049-59	Carbon	4.7K ohms 1/6W
R047	YFSC049-56	Carbon	1K ohms 1/6W
R048	YFSC049-58	Carbon	2.2K ohms 1/6W
R049	YFSC049-59	Carbon	4.7K ohms 1/6W
R050, 051	YFSC049-62	Carbon	10K ohms 1/6W
R052	YFSC049-64	Carbon	22K ohms 1/6W
R053	YFSC049-82	Carbon	330K ohms 1/6W
R054	YFSC049-62	Carbon	10K ohms 1/6W
R055	YFSC049-65	Carbon	33K ohms 1/6W
R056, 057	YFSC049-64	Carbon	22K ohms 1/6W
R058	YFSC049-65	Carbon	33K ohms 1/6W
R059, 060	YFSC049-64	Carbon	22K ohms 1/6W
R061	YFSC049-65	Carbon	33K ohms 1/6W
R062, 063	YFSC049-64	Carbon	22K ohms 1/6W
R064	YFSC049-69	Carbon	100K ohms
R065	YFSC049-56	Carbon	1K ohms 1/6W
Z001	YFSS515-06	Block Resistor	
C016	YFSC002-50	Ceramic	120 pF 50V
C017	YFSC002-41	Ceramic	470 pF
C018	ECEAIAK331	Electrolytic	330 μF 10V
C019	ECEAICK100	Electrolytic	10μF 16V
C020	ECEAIAK220	Electrolytic	22 μF 10V
C021	YFSC002-52	Ceramic	0.015 μF 50V
C022	YFSC002-11	Ceramic	1000 pF 50V
C023	ECEA1HS010	Electrolytic	1 μF 50V
C024	ECEA1HS0IR1	Electrolytic	0.1 μF 50V
C025	ECEA1HS2R2	Electrolytic	2.2 μF 50V
C026-032	YFSC004-20	Ceramic	0.01 μF 50V
C033	ECUX1H473MD	Ceramic	0.047 μF 50V
L001	YFFL5H560K	Inductor	56 μH
L002	YFFL5H101K	Inductor	100 μH
CN002-JM	EMCS0650Z	6 pin Jack Male	
CN003-JM	EMCS0250Z	2 pin Jack Male	
CN004-JM	EMCS0850Z	8 pin Jack Male	

YFES950-43B
AUTO FOCUS BOARD-B

SYMBOL NO.	PART NO.	DESCRIPTION	
PCB022	* YFES950-43B	Pronted circuit Board Assembly	
IC003	UPC393C	IC	
IC004	UPD4069	IC	
Q001	2SA1115	Transistor	
Q002	2SC2603	Transistor	
Q003	2SN873	Transistor	
Q004	2SD965	Transistor	
Q005	2SC1317	Transistor	
Q006	2SC2603	Transistor	
Q007	2SA1115	Transistor	
Q008-010	2SC2603	Transistor	
D005	MZ308	Diode	
D006-011	MA165	Diode	
TH001,002	YF SC010-09	Thermistor	
R005	YFSC049-60	Carbon	5.6K ohms 1/6W
R006	YFSC049-64	Carbon	22K ohms 1/6W
R007	YFSC049-58	Carbon	2.2K ohms 1/6W
R008	YFSC049-60	Carbon	56K ohms 1/6W
R009	ERC14GJ4R7	Solid	4.7 ohms 1/4W
R010	YFSC049-79	Carbon	470 ohms 1/6W
R011, 012	YFSC049-53	Carbon	27 ohms 1/6W
R013	YFSC049-56	Carbon	1K ohms 1/6W
R014	YFSC049-70	Carbon	220K ohms 1/6W
R015	YFSC049-68	Carbon	68K ohms 1/6W
R016	YFSC049-57	Carbon	1.5K ohms 1/6W
R017	YFSC049-66	Carbon	47K ohms 1/6W
R018	YFSC049-62	Carbon	10K ohms 1/6W
R019	YFSC049-73	Carbon	39K ohms 1/6W
R020	YFSC049-54	Carbon	120 ohms 1/6W
R021	YFSC049-60	Carbon	5.6K ohms 1/6W
R022	YFSC049-58	Carbon	2.2K ohms 1/6W
R023	YFSC049-59	Carbon	4.7K ohms 1/6W
R024	YFSC049-62	Carbon	10K ohms 1/6W
R025	YFSC049-81	Carbon	12K ohms 1/6W
R026	YFSC049-69	Carbon	100K ohms 1/6W
R027	YFSC049-64	Carbon	22K ohms 1/6W
R028	YFSC049-69	Carbon	100K ohms 1/6W
R029	YFSC049-82	Carbon	330K ohms 1/6W
R030, 031	YFSC049-62	Carbon	10K ohms 1/6W
R032	YFSC049-83	Carbon	30K ohms 1/6W
VR001	EVNBLAA00B34	Variable Resistor	30K ohms
VR002	EVNALAA00B54	Variable Resistor	50K ohms
VR003,004	EVNALAA00B14	Variable Resistor	10K ohms
C005	ECEA1AS471	Electrolytic	470 μF 10V
C006	YFSC002-51	Ceramic	3900 pF 50V
C007	YFSC004-20	Ceramic	0.01 μF 50V
C008	ECEA1AS220	Electrolytic	22 μF 10V
C009, 010	YFSC004-20	Ceramic	0.01 μF 50V

SYM-BOL NO.	PART NO.	DESCRIPTION	
C011	YFSC002-11	Ceramic	1000 pF
C012	ECSF1VE334	Electrolytic	0,33 μF 35V
C013	ECQP1271JZ	Plastic	270 pF 100V
C014	ECEA1HK2R2	Electrolytic	2.2 μF 50V
C015	YFSC002-34	Ceramic	2200 pF 50V
T002	YFSS516-10	IFT	
E001	YFSG800-13	10 pin Flat Cable	
CN005	YFSS111-78	3 pin Connector	
M155	YFES113-10	Shield Case	

YFES950-43C
AUTO FOCUS BOARD-C

SYM-BOL NO.	PART NO.	DESCRIPTION	
PCB023	*YFES950-43C	Printed circuit Board Assembly	
IC002	TA7120P	IC	
D001-004	MA171	Diode	
R001	YFSC049-80	Carbon	8.2K ohms 1/6W
R002	YFSC049-59	Carbon	4.7K ohms 1/6W
R003	YFSC049-67	Carbon	56K ohms 1/6W
R004	YFSC049-66	Carbon	47K ohms 1/6W
C001	YFSC102-25	Ceramic	2200 pF 400V
C002	YFSC004-20	Ceramic	0.01 μF 50V
C003	ECEA1CK100	Electrolytic	10 μF 16V
C004	ECEA1HKR22	Electrolytic	0.22 μF 50V
T001	YFSS516-09	Transformer	
CN001	YFSS111-88	5 pin Connector	

ACCESSORY PARTS/PACKAGING PARTS

SYM-BOL NO.	PART NO.	DESCRIPTION
BAT101	UM3NEP	Battery
M181	*YFV5MA0010A4	Shoe
M182	*YFD8QA0321AN	Operating Instruction
M183	YFV8SA0009BN	Safety Notice
M184	YFV8RA0021AN	Handbook
M185	YFPTM83C21	Warranty Card
M186	YWT10X10C03	Polyethylene Bag for Shoe
M187	YWT10X35C03	Polyethylene Bag for Microphone
M188	YZB20X35A02	Polyethylene Bag for EVF and Cable
M189	XZB38X50A03	Polyethylene Bag for Camera
M190	XZB26X40C05	Polyethylene Bag for Operating Instruction
M195	*YFV9CA0306AN	Packaging Case

WV-CR10 CAMERA REMOTE CONTROL

MISCELLANEOUS

SYM-BOL NO.	PART NO.	DESCRIPTION
E001	*YFRCABLE90A	Remote Control Cable Ass'y
M002	*YFV5WA0125AS	Upper Cover Ass'y
M003	*YFV5EA0054A2	Bottom Cover
M004	*YFV5RA0011A4	Slide Switch Knob
M005	*YFV6JA0006A4	Push Knob (X2)
M006	*YFV6JA0011A4	Zoom and Focus Knob (X2)
M007	*YFV6JA0012A4	Lock Knob
M008	*YFV2CA0012A4	Mounting Plate
M009	YFV2CA0018A4	Mounting Angle
M010	*YFV2SA0024A4	Mounting Plate for 8 pin Connector
M011	*YFV4RA0002A4	Lock Arm Lever
M012	*YFV2FA0021C4	Switch Cushion
M013	*YFV2PA0018B4	Insulater Sheet for Circuit Board
M014	*YFV4JA0015A4	Leaf Spring
M015	*YFV4JA0016A4	Coil Spring
M016	*YFV7QA0380A4	Main Label
M017	YVZC700RB50	Serial No. Label
M018	*YFV4DA0003A4	Look Cam
M019	YFV7SA0046A4	8pin Connector Label Lock Cam

YFVPKB0101JA
CAMERA REMOTE CONTROL BOARD

SYM-BOL NO.	PART NO.	DESCRIPTION		
PCB001	*YFVPKB0101JA	Printed Circuit Board Assembly		
Q001,002	2SD636-QRS	Transistor		
Q003	2SB788-STU	Transistor		
Q004,005	2SD636-QRS	Transistor		
R001	ERD10TJ273	Carbon	27KΩ	1/8W
R002	ERD10TJ393	Carbon	39KΩ	1/8W
R003	ERD10TJ123	Carbon	12KΩ	1/8W
R004	ERD10TJ273	Carbon	27KΩ	1/8W
R005~007	ERD10TJ223	Carbon	22KΩ	1/8W
R008	ERD10TJ913	Carbon	91KΩ	1/8W
R009	ERD10TJ752	Carbon	7.5KΩ	1/8W
R010	ERD10TJ912	Carbon	9.1KΩ	1/8W
R011	ERD10TJ104	Carbon	100KΩ	1/8W
R012	ERD10TJ153	Carbon	15KΩ	1/8W
R013,014	ERD10TJ201	Carbon	200Ω	1/8W
R015	ERD10TJ104	Carbon	100KΩ	1/8W
R016	ERD10TJ153	Carbon	15KΩ	1/8W
C001	ECKF1H301KB	Ceramic	300pF	50V
C002	ECEA1HSS010	Electrolytic	1μF	50V
C003,004	ECKF1H102KB	Ceramic	1000pF	50V
C005	ECKF1H681KB	Ceramic	680pF	50V
SW001,002	EVQQS405K	Push Switch		
SW003	YWSSF-012M	Slide Switch		
SW004,005	KEG10904	Push Switch		
SW006,007	EVQQS405K	Push Switch		
CN001-JM	EMCS1350ZL	13 pin Jack Male		
M025	YFV2NA0005A4	Spacer for Switch		

YFVPKB0101J2
CONNECTOR BOARD

SYM-BOL NO.	PART NO.	DESCRIPTION
PCB002	*YFVPKB0101J2	Printed Circuit Board Assembly
CN106	YFRP610RD8S	8 pin Connector

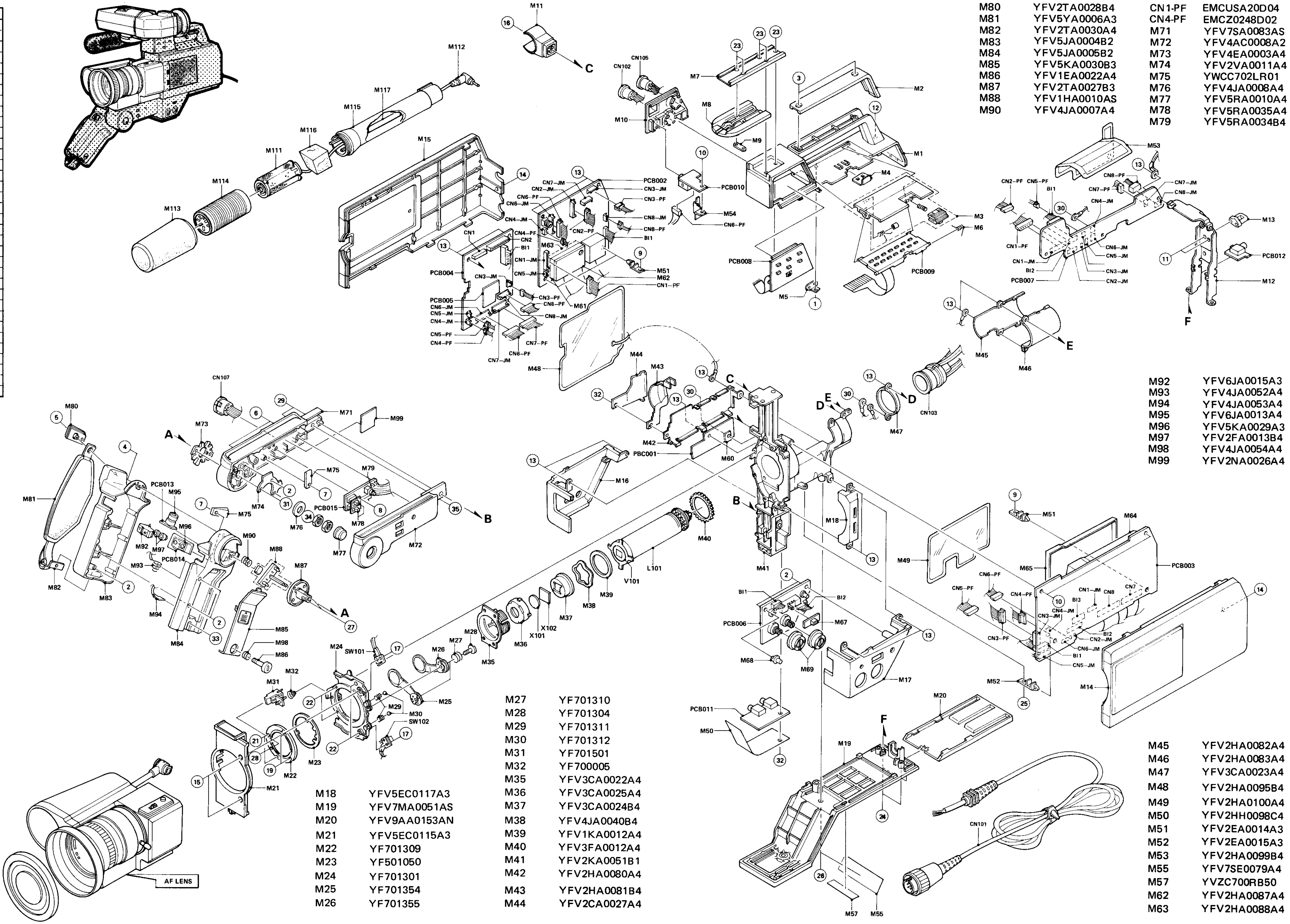
ACCESSORY PARTS/PACKAGING PARTS

SYM-BOL NO.	PART NO.	DESCRIPTION
M021	*YFV8QA0380AN	Operating Instruction
M022	*YFV5MA0010C03	Shoe
M023	YFV8EA0001A4	Poliethyene Bag for Remote Controller
M024	YWT10X10C03	Polyethylene Bag for Shoe
M025	YWT15X20C03	Polyethylene Bag for Operating Instruction
M026	YWT20X35C03	Polyethylene Bag for Power Cord
M028	YFV9CA0326AN	Packaging Case

EXPLODED VIEWOF CAMERA

○ Numbers show Screws

No.	Screw	Description
①	XTB26+6BFX	Binding Head Tapping Screw
②	XTB26+8BFX	Binding Head Tapping Screw
③	XTB26+6BFXK	Binding Head Tapping Black Screw
④	XTB26+8BFXK	Binding Head Tapping Black Screw
⑤	XTB26+10BFXK	Binding Head Tapping Black Screw
⑥	XTB3+25BFXK	Binding Head Tapping Black Screw
⑦	XTN26+6BFX	Pan Head Tapping Screw
⑧	XTN26+8BFX	Pan Head Tapping Screw
⑨	XTW26+8EFX	Washer Head Tapping Screw
⑩	XSB2+4FX	Binding Head Screw
⑪	XSB2+5FX	Binding Head Screw
⑫	XSB26+4FX	Binding Head Screw
⑬	XSB26+6FX	Binding Head Screw
⑭	XSB26+6FC	Binding Head Screw
⑮	XSB26+6FXK	Binding Head Black Screw
⑯	XSB26+16FXK	Binding Head Black Screw
⑰	XSB14+5FX	Binding Head Screw
⑱	XSB4+16FX	Binding Head Screw
⑲	XSN2+4FC	Pan Head Machine Screw
⑳	XSN2+6FC	Pan Head Machine Screw
㉑	XSN2+8FC	Pan Head Machine Screw
㉒	XSS2+4FX	Flush Head Machine Screw
㉓	XSS2+6FXK	Flush Head Machine Black Screw
㉔	XSS26+4FX	Flush Head Machine Screw
㉕	XSS26+6FX	Flush Head Machine Screw
㉖	XSS26+6FXK	Flush Head Machine Black Screw
㉗	XSS3+8FX	Flush Head Machine Screw
㉘	XTS2+4FX	Flush Head Machine Tapping Screw
㉙	XYN4+C20FX	Machine Screw and Washer Assembly
㉚	XYN26+C6FX	Machine Screw and Washer Assembly
㉛	XYN3+AC12FX	Machine Screw and Washer Assembly
㉜	XYN26+F6FX	Machine Screw and Washer Assembly
㉝	JE–2	E Ring
㉞	XWE8JFX	Small Round Plain Washer
㉟	XTS26+8BFX	Flush Head Machine Tapping Screw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CN3-JM
CN2-JM
CN6-JM
CN5-JM
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CN103
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CN107
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SW102
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PCB006
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M83	YFV5JA0004B2
M84	YFV5JA0005B2
M85	YFV5KA0030B3
M86	YFV1EA0022A4
M87	YFV2TA0027B3
M88	YFV1HA0010AS
M90	YFV4JA0007A4

CN1-PF	EMCUSA20D04
CN4-PF	EMCZ0248D02
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M72	YFV4AC0008A2
M73	YFV4EA0003A4
M74	YFV2VA0011A4
M75	YWCC702LR01
M76	YFV4JA0008A4
M77	YFV5RA0010A4
M78	YFV5RA0035A4
M79	YFV5RA0034B4

M92	YFV6JA0015A3
M93	YFV4JA0052A4
M94	YFV4JA0053A4
M95	YFV6JA0013A4
M96	YFV5KA0029A3
M97	YFV2FA0013B4
M98	YFV4JA0054A4
M99	YFV2NA0026A4

PCB001	YFVPKA0702JA
PCB002	YFVKY4860P1A
PCB003	YFVKZ4860P3A
PCB004	YFVKY3230P4A
PCB005	YFVPKA0714JA
PCB006	YFVAKA0166AN
PCB007	YFVKY3230P5A
PCB008	YFVAKA0170AN
PCB009	YFVAKA0169AN
PCB010	YFVKZ3230PBA
PCB011	YFVKZ3230PAA
PCB012	YFVAKA0136AN
PCB013	YWV3100ZK07
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PCB015	YFVKZ3230P8A
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X101	YWIR1R6X16R5
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L101	YFS4158KIT
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SW102	D2MQ1L
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CN102	D8113N601
CN103	VIDSOCKETC70
CN105	D5113N600
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M5	YFV2CA0024A4
M6	YFV4JA0043A4
M7	YFV5MA0007B4
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M16	YFV5ED0118A3

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M28	YF701304
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M32	YF700005
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M40	YFV3FA0012A4
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M45	YFV2HA0082A4
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M49	YFV2HA0100A4
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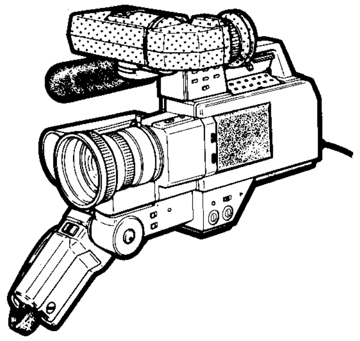
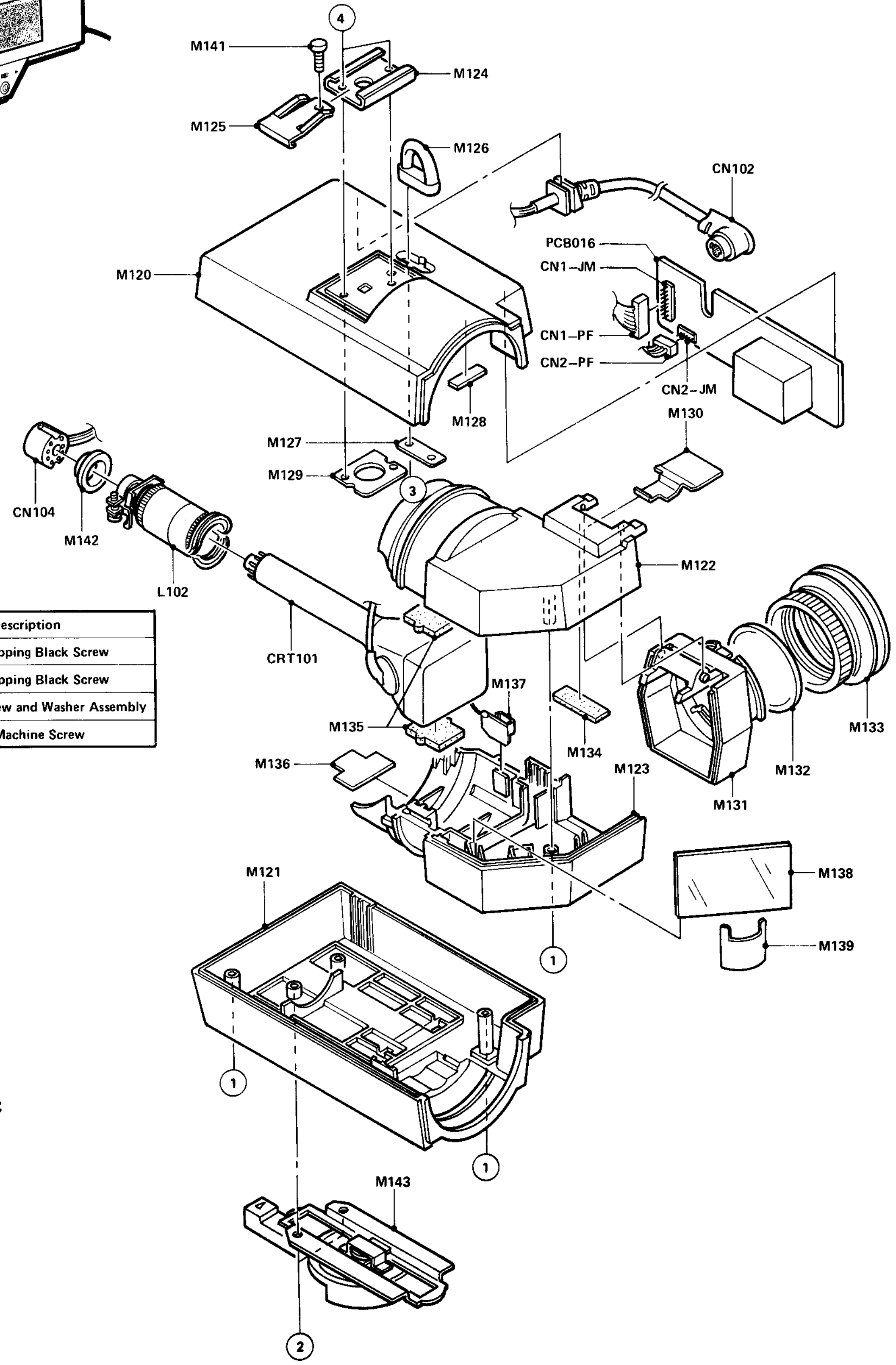
EXPLODED VIEW



EVF



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M120
CN1–PF
CN2–PF
CN2–JM
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M130
M127
M129
③
CN104
M142
L102
M122
CRT101
M137
M135
M136
M134
M123
M131
M132
M133
M121
M138
M139
①
①
①
M143
②

○Numbers show Screws

No.	Screw	Description
①	XTN26+25BFXK	Pan Head Tapping Black Screw
②	XTN26+8BFXK	Pan Head Tapping Black Screw
③	XYM2+F8FX	Machine Screw and Washer Assembly
④	XSS2+5FXK	Flush Head Machine Screw

PCB016	YFVPKA0706JB
CRT101	40JB4
L102	ELY15V202A
CN102	E8130J600
CN104	YFS7506P70S
M120	YFV5ED0127A2
M121	YFV5EC0128A2
M122	YFV7MA0059AS
M123	YFV7MA0049AS
M124	YFV5MA0002A4
M125	YWCC704WM07
M126	YFV2TA0031A4
M127	YFV1FA0005A4
M128	YFV4JA0049A4
M129	YWCC704AM03C
M130	YFV4JA0046A4
M131	YFV3CB0031A3
M132	YFV1VA0008A4
M133	YFV5GA0019A4
M134	YFV2FA0053A4
M135	YFV2FA0049B4
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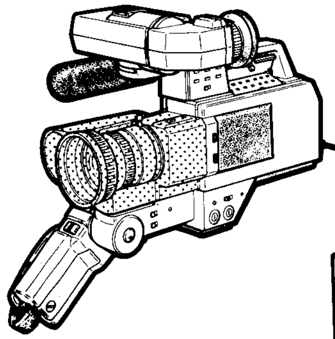
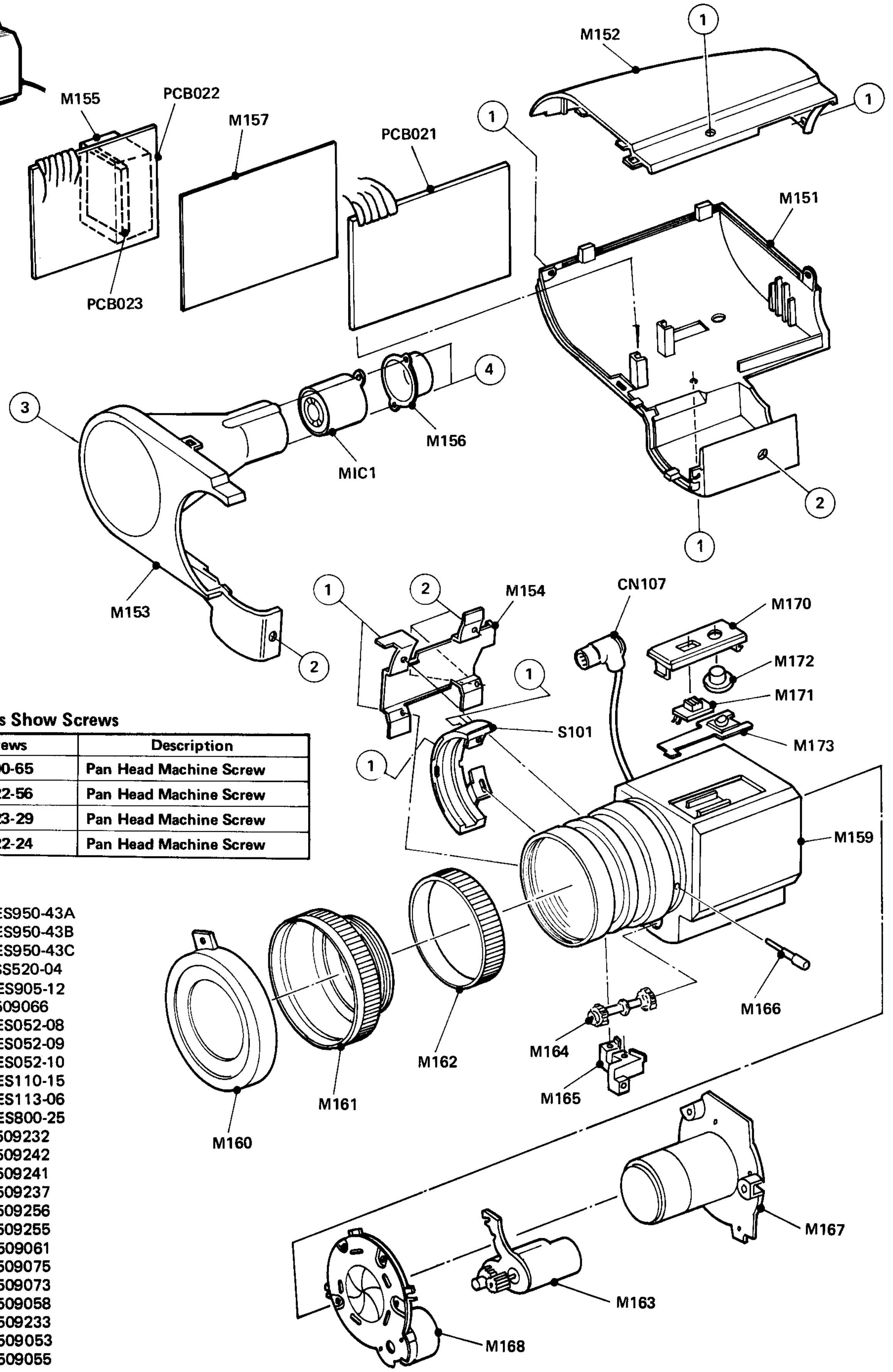


AUTO FOCUS LENS



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M151
PCB023
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①
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M159
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M165
M160
M167
M163
M168

○ **Numbers Show Screws**

No.	Screws	Description
①	YFSG000-65	Pan Head Machine Screw
②	YFSG022-56	Pan Head Machine Screw
③	YFSG023-29	Pan Head Machine Screw
④	YFSG022-24	Pan Head Machine Screw

PCB021	YFES950-43A
PCB022	YFES950-43B
PCB023	YFES950-43C
X001	YFSS520-04
S101	YFES905-12
CN107	YF509066
M151	YFES052-08
M152	YFES052-09
M153	YFES052-10
M154	YFES110-15
M156	YFES113-06
M157	YFES800-25
M159	YF509232
M160	YF509242
M161	YF509241
M162	YF509237
M163	YF509256
M164	YF509255
M165	YF509061
M166	YF509075
M167	YF509073
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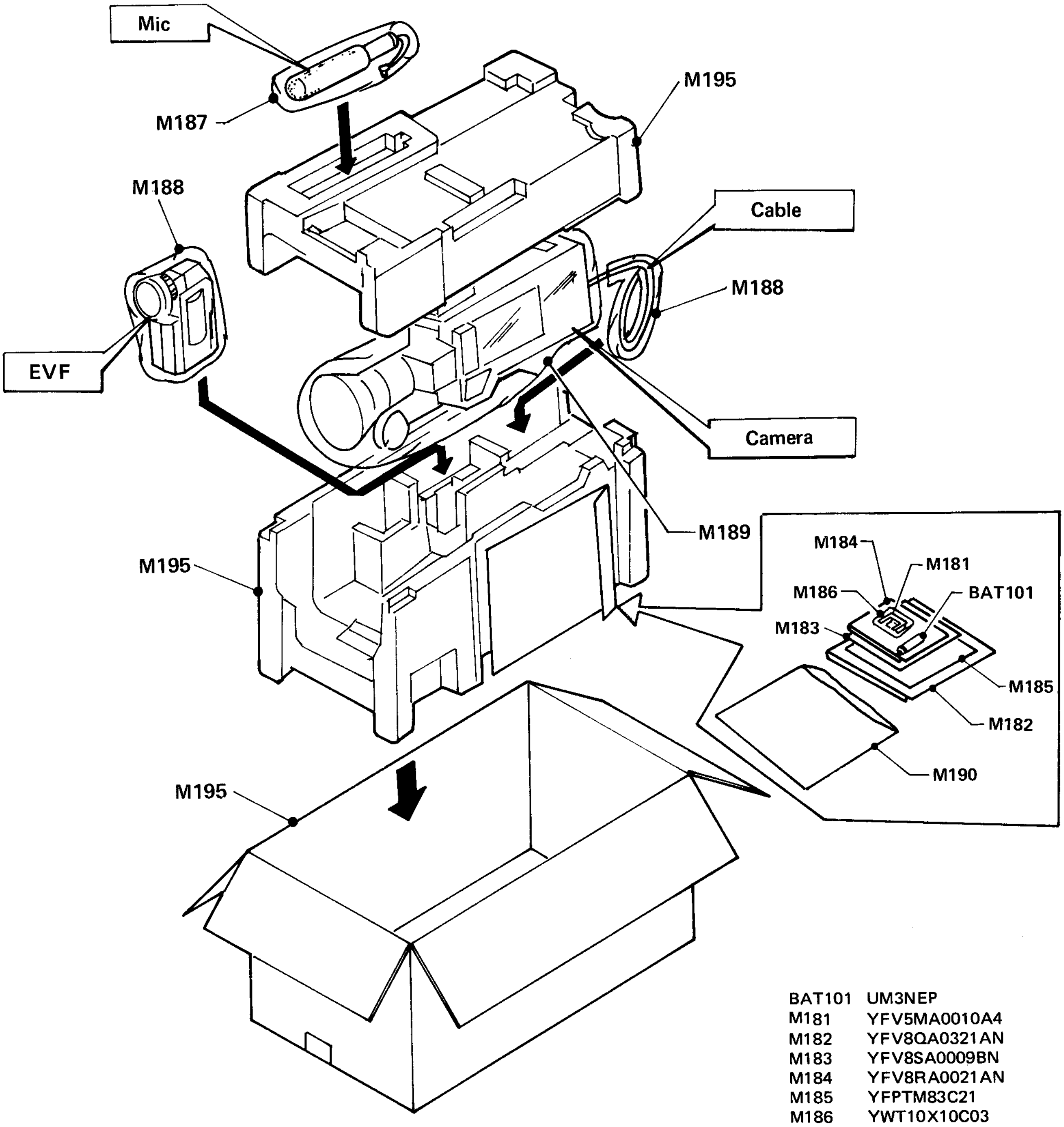
M172	YF509055
M173	YF509046

PACKAGING OF CAMERA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BAT101
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M182
M190
M195

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M183	YFV8SA0009BN
M184	YFV8RA0021AN
M185	YFPTM83C21
M186	YWT10X10C03
M187	YWT10X35C03
M188	YZB20X35A02
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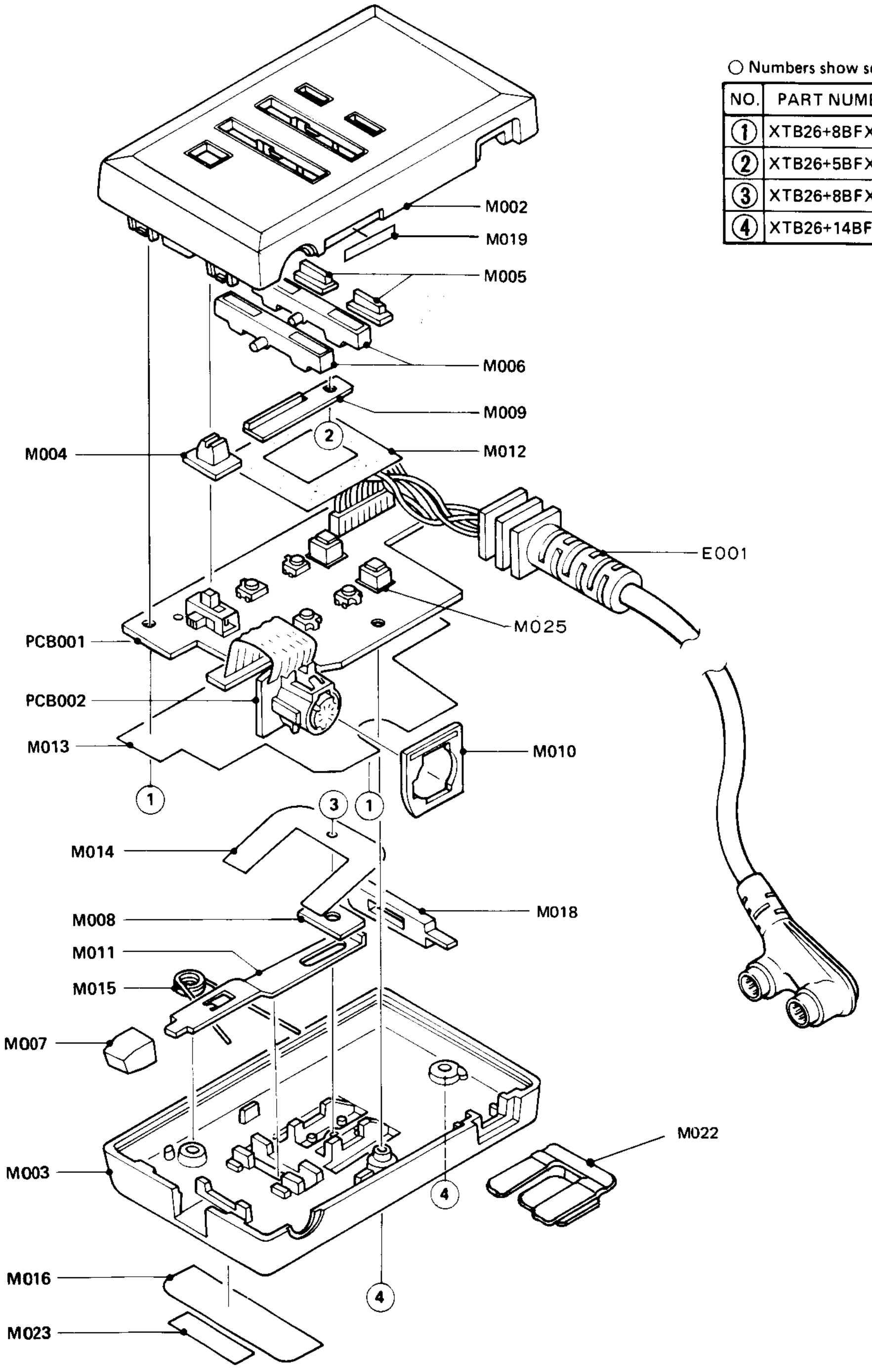
M195	YFV9CA0306AN

EXPLODED VIEWOF CAMERA REMOTE CONTROLLOR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PCB002
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①
③
①
M014
M018
M008
M011
M015
M007
M003
M022
④
M016
④
M023

○ Numbers show screws

NO.	PART NUMBER	DESCRIPTION
①	XTB26+8BFX	Binding Head Tapping Screws
②	XTB26+5BFX	Binding Head Tapping Screws
③	XTB26+8BFXK	Binding Head Tapping Screws (Black)
④	XTB26+14BFXK	Binding Head Tapping Screws (Black)

PCB001	YFVPKB0101JA
PCB002	YFVPKB0101J2
E001	YFRCABLE90
M002	YFV5WA0380AS
M003	YFV5EA0054A2
M004	YFV5RA0011A4
M005	YFV6JA0006A4
M006	YFV6JA0011A4
M007	YFV6JA0012A4
M008	YFV2CA0012A4
M009	YFV2CA0018A4
M010	YFV2SA0024A4
M011	YFV4RA0002A4
M012	YFV2FA0021C4
M013	YFV2PA0018B4
M014	YFV4JA0015A4
M015	YFV4JA0016A4
M016	YFV7QA0380A4
M017	YVZC700RB50
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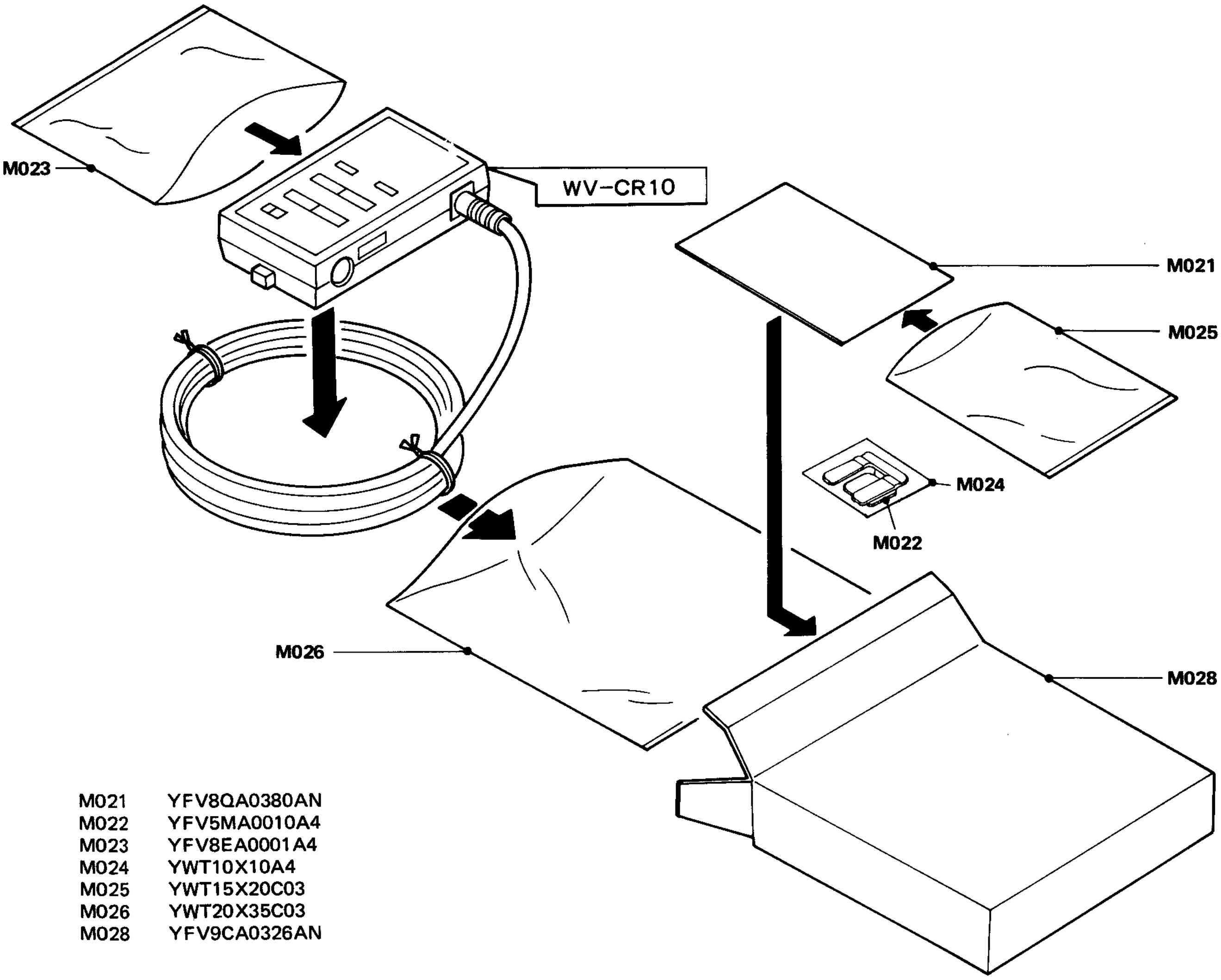
M022	YFV5MA0010A4

PACKAGING OF CAMERA REMOTE CONTROLLOR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WV-CR10
M021
M025
M024
M022
M026
M028

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M022	YFV5MA0010A4
M023	YFV8EA0001A4
M024	YWT10X10A4
M025	YWT15X20C03
M026	YWT20X35C03
M028	YFV9CA0326AN